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Memorandum

TO: Commission DATE: January 24, 2007

FR: Therese McMillan, Deputy Executive Director

RE: 2006 Spare the Air/Free Transit Campaign Evaluation and Funding Allocation for 2007

The Programming and Allocation Committee voted unanimously to refer approval of $7.5 million in Congestion Mitigation and Air Quality Improvement (CMAQ) funds for the 2007 Spare the Air/Free Transit Campaign to the Commission.

MTC staff presented the 2006 campaign evaluation results to the Bay Area Partnership Board in December. Based on the discussion, the Partnership Board approved the campaign with a recommendation to the Commission to fund the 2007 campaign contingent upon MTC finding a way to address some of the security and operational issues as a result of the 2006 campaign raised by the various operators such as BART, Caltrain, Golden Gate and Alameda ferries.

MTC staff recommends that the 2007 campaign continue to offer free all day transit subject to addressing security and operation consensus raised by the operators. In addition to modifying some of the program parameters for next year's campaign, staff is currently seeking private sponsorship to offset some of the program costs.

Therese W. McMillan

Attachment: 2006 Spare the Air/Free Transit Campaign Evaluation

TM:AN

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2006 Spare the Air/Free Transit Campaign Evaluation

Metropolitan Transportation Commission
Bay Area Air Quality Management District

October 2006

The Metropolitan Transportation Commission and the Bay Area Air Quality Management District wish to thank the following individuals who were instrumental in developing and implementing the 2006 Spare the Air/Free Transit Campaign:

Bay Area Transit Operators
John Andoh, *Benicia Breeze & Rio Vista Breeze*
Mona Babauta, *Santa Rosa CityBus*
Mary Burdick, *County Connection*
Rosemary Booth, *LAVTA/Wheels*
Deborah Brunner, *VINE*
Marc Caposino, *Muni*
Bill Caps, *VTA*
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Richard Davis, *Petaluma Transit*
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George Fink, *Fairfield/Suisun Transit*
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Andrina Ramirez & Amy Schwartz, *Swirl*
Dr. Timothy McLarney & Richard Sarles, *True North Research* and Eric N. Schreffler, *Eric Schreffler Transportation Consultants (ESTC)*

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EXECUTIVE SUMMARY

The Metropolitan Transportation Commission (MTC) and the Bay Area Air Quality Management District (BAAQMD, or Air District) partnered with 26 Bay Area transit operators to offer *free* rides, *all-day*, on the first six, non-holiday Spare the Air weekdays of the 2006 summer ozone season, which started on June 1 and ended on October 13. The 2006 Spare the Air/Free Transit Campaign (2006 Campaign) is an episodic measure that is implemented only when ground-level ozone pollution ("smog") levels are expected to be highest. Ground-level ozone is created on stagnant summer days when reactive organic compounds (ROG) react with nitrogen oxides (NOx) in the presence of heat and sunlight.

The partner agencies established three clear goals for the 2006 Campaign:

1. Increase public awareness about "sparing the air"
2. Encourage Bay Area residents to drive less and use public transit more
3. Reduce emissions to avert national 8-hour ozone exceedances

The Air District issued a total of eleven Spare the Air advisories during the 2006 summer ozone season. The free transit rides were offered on participating systems on the first six Spare the Air weekdays: June 22, 23, and 26 and July 17, 20, and 21, 2006. The six Spare the Air/Free Transit days produced the following key results (as compared to baseline conditions):

TRANSIT RIDERSHIP

Participating Bay Area transit operators collected and verified ridership estimates for each of the six Spare the Air days, and provided the baseline conditions, which represent the ridership counts for the same day from the previous week (except for Muni, Caltrain, and WestCat). Methods used to collect ridership data varied amongst the operators, ranging from manual passenger counts to use of automated passenger counters to field sampling of routes and stations. Note that there is a margin of error associated with the ridership estimates due to the data collection methods used. Thus, some ridership figures may be under- or over-estimated.

- Transit ridership levels rose by approximately 15 percent regionwide over the six Spare the Air days, adding a total of 1.35 million riders. This equates to an average of an additional 225,000 riders per Spare the Air day.

- Muni saw the highest absolute ridership gain, with close to 500,000 additional riders (up 12 percent) compared to the baseline on its system over six Spare the Air days. Muni was followed by AC Transit, which had 360,000 additional riders (up 28 percent), BART with 152,000 additional riders (up 8 percent), and VTA bus with 81,000 additional riders (up 15 percent).

- Other large bus operators saw substantial absolute ridership gains over the six Spare the Air days as well. Golden Gate Transit carried 29,000 additional riders (up 20 percent) compared to the

baseline. SamTrans registered 24,000 additional riders (up 10 percent), and County Connection had 16,500 additional riders (up 21 percent). Even smaller suburban bus operators experienced substantial ridership increases. These include Tri Delta with 13,000 additional riders (up 26 percent) and WestCat with 10,000 additional riders (up 48 percent).

- Ridership levels also rose on light-rail and passenger rail services over the six Spare the Air days compared to the baseline. VTA light-rail carried an additional 46,300 riders (up 25 percent), Caltrain drew 4,000 additional riders (up 25 percent) and ACE carried 1,800 additional riders from the Central Valley into the Bay Area (up 11 percent).

- The most dramatic percentage increases in ridership levels occurred on the ferry systems. Golden Gate Sausalito Ferry led the way with a 326 percent over the six Spare the Air days, going from an average of 1,800 ferry riders per day to 7,600. The Golden Gate Larkspur Ferry also fared well, with ridership climbing 93 percent from an average of 5,200 ferry riders per day to 10,000 riders per day. Alameda-Oakland and Alameda Harbor Bay Ferries experienced a 226 percent ridership gain, going from an average of 1,800 ferry riders per day to 5,900 ferry riders per day.

TRANSIT TRAVEL BEHAVIOR

Godbe Research conducted onboard passenger surveys for MTC to assess the impact of offering free transit during Spare the Air weekdays. In total, 6,744 passengers were interviewed for this study. Based on the analysis of the survey data, the key findings are as follows:

Trip Origin and Destination

- The majority of respondents started their trip either at home (56 percent) or at work (27 percent). Similarly, the same two responses were the destination for most respondents (work equals 43 percent, home equals 28 percent).

Mode of Arrival to Transit

- Forty-three percent of the respondents reported that walking was their mode of arrival to the bus, train, or ferry stop/station, while 21 percent drove, 19 percent transferred from other transit, nine percent were dropped off, and three percent carpooled.

Typical Mode of Transportation

- Sixty-two percent of the respondents indicated that they typically use public transit to make the trip they were on. Twenty-three percent indicated that they typically use a car, six percent walk, three percent carpool, and two percent ride a bike as their typical mode of transportation. In total, 26 percent typically use a car for their trip.

Spare the Air Awareness

- Over two-thirds of the respondents, 68 percent, were aware that it was a Spare the Air day.

- Twenty-three percent reported that they rode public transit specifically because it was a Spare the Air/Free Transit day, while the remaining 78 percent normally use transit.

Impact of Spare the Air
In order to calculate the Spare the Air impact, an "impacted" respondent was defined as someone who noted being aware it was a Spare the Air day, took public transit as a result, and typically used a car as their primary mode of transportation. In other words, an impacted respondent made a conscious decision to change their travel behavior by taking transit rather than driving their car because it was a Spare the Air day.

- The result of this impact calculation showed that 9.4 percent of the respondents were "impacted."

When comparing this year's survey results to the 2005 Spare the Air/Free Morning Commute Campaign survey results, there was 7-percentage point increase in the Spare the Air awareness – from 61 percent in 2005 to 68 percent in 2006. More importantly, the share of "impacted" respondents rose from 3.6 percent to 9.4 percent.

DRIVING BEHAVIOR

The True North Research and Eric N. Schreffler, Transportation Consultants (ESTC) team was commissioned by the Air District to conduct telephone surveys to gauge the effectiveness of the Spare the Air education and outreach program and understand the public's attitudes and behavior in response to the 2006 Spare the Air/Free Transit Campaign. Telephone surveys were conducted in the evening on each of the first six Spare the Air weekdays of the 2006 ozone season. In total, 1,250 randomly selected drivers within the Air District's boundaries participated in the telephone survey. The key findings are outlined below.

- The average number of car trips taken on a Spare the Air day in 2006 was 2.35.

- Individuals who reduced at least one trip for air quality reasons reported taking an average of 2.18 trips.

- Nearly ten percent (9.84 percent) of Bay Area drivers reduced at least one trip in response to the 2006 summer season Spare the Air campaign.

- The most common method of reducing one's driving was linking trips, followed by eliminating a trip, rather than by changing their mode of travel.

- Shopping trips and trips to and from work were the most common types of trip reduced for air quality reasons in 2006.

RECALL AND AWARENESS OF SPARE THE AIR MESSAGING

Based on the True North/ESTC telephone survey, the following are the key findings related to recall and awareness of the Spare the Air messaging:

- Seventy-six percent (76 percent) of respondents indicated that they recalled being exposed to news stories or public service announcements related to air quality and/or Spare the Air in the two days prior to the interview.

- The most commonly mentioned sources of information about Spare the Air included television, radio and newspaper.

- Nearly two-thirds (66 percent) of all respondents were aware that the day of the interview was a Spare the Air day.

- Nearly two-thirds of respondents were also aware that commuters were able to ride public transit for free on the day of the interview (Spare the Air day).

- One percent of all drivers in the Bay Area sample chose to ride transit on a Spare the Air day because it was free – not because they normally ride transit.

- Nearly half (49 percent) of drivers indicated that they would be more likely to ride transit on a Spare the Air day if it were always free on these days.

Linking the Spare the Air public education program with the free transit offered has dramatically increased the recalled exposure to Spare the Air messaging – from 54 percent in 2003 (prior to the free transit program) to more than 75 percent in 2006. Furthermore, the percent of drivers who were aware of the program has increased steadily since the inception of the Spare the Air/Free Morning Commute Campaign in 2004 – 65.6 percent driver awareness of Spare the Air in 2006 compared to 52.7 percent in 2005 and 51.0 percent in 2004. Similarly, the percent of drivers who reduced at least one trip due to the Spare the Air campaign has increased more than 350 percent since the introduction of the free transit program – from 2.78 percent in 2003 to 9.84 percent in 2006.

EMISSION REDUCTIONS

- An estimated 2.221 tons of nitrogen oxides (NOx), 2.179 tons of reactive organic gases (ROG), and 0.852 tons of particulate matter (PM-10) *per Spare the Air day* were reduced by persuading an estimated 465,444 drivers to reduce an estimated 1.14 trips each. Collectively, drivers reduced an estimated 528,279 vehicle trips and more than 3.5 million miles of travel per Spare the Air day.

- Another 0.115 tons of ROG were removed *per Spare the Air day* from decreased or avoided use of consumer products such as aerosol hairspray, lighter fluid for barbeques, and gas powered garden equipment.

- The estimated emissions reductions for the six Spare the Air days are 13.33 tons of NOx, 13.07 tons of ROG, and 5.11 tons of PM-10 from trip reduction and an additional 0.69 tons of ROG were removed from decreased or avoided use of consumer products.

- The program cost is $13.2 million, and the emission reductions are 32.2 tons of ROG, NOx and PM-10 combined for the six days. So, the cost-effectiveness estimate is $410,800 per ton of emissions reduced. Although it produces the largest emissions reductions, the 2006 Campaign is the much less cost-effective compared to other transportation-air quality strategies, as shown below.

Table: ES-1: Comparative Summary of Various Bay Area Air Quality Strategies – Costs, Emission Reductions, and Cost-Effectiveness

Project	Program Cost	Emission Reductions (tons/day)	Cost Per Ton Emissions Reduced*
Vehicle Buy Back Program *Pay $650 to owner and scraps an operational and registered 1985 or older vehicle*	$7.36 million	1.0	$7,300
Urban Bus Retrofit Program *Retrofit 1,700 diesel buses from 13 Bay Area transit agencies with emission control devices*	$30.7 million	1.43	$8,000
Solid Waste Collection Vehicle Program *Install emission control devices on 218 diesel refuse trucks and purchase 20 new natural gas refuse trucks*	$3.1 million	0.04 for natural gas trucks, 0.12 for truck retrofit	$12,000 for natural gas trucks, $16,600 for truck retrofit
Regional Arterial Signal Timing *Provide consultant assistance to cities/counties to update traffic signal coordination plans*	$1.076 million	0.023	$41,000
Regional Rideshare Program *Provide carpool/vanpool formation assistance and information on transportation alternatives*	$2.85 million	0.18	$44,000
Vehicle Incentive Program *Provide grant to public agencies to acquire low emission, light-duty alternative fuel vehicles*	$0.5 million	0.046	$56,348
LNG infrastructure Project *Purchase liquefied natural gas (LNG) hostler and retrofits 9 diesel trucks with LNG*	$3.0 million	0.48 for hostler, 0.0013 for trucks	$6,000 for hostler, $453,260 for trucks
Spare the Air/Free Transit Campaign *Offer free fares on six Spare the Air weekdays on participating transit systems*	$13.2 million	4.51	$410,800
State TCM 3: Improve Local and Areawide Bus Service* *Improves and expands enhanced bus, bus rapid transit, and regional express bus services*	$480.0 million	0.28	$823,000
State TCM 5: Improve Access to Rail and Ferries* *Implements Safe Routes to Transit and RM2 Transit Connectivity Study recommendations, develops demonstration station car and bike station concepts, and explores shuttle options*	$185.0 million	0.11	$2.3 million
State TCM 4: Upgrade and Expand Local and Regional Rail Service* *Upgrade BART, Muni, VTA, Caltrain, etc.*	$12.2 billion	0.54	$6.3 million

*Cost-effectiveness estimate is based on total project cost.

**Assumes 2015 implementation year for State TCMs from 2005 Ozone Strategy

Source: MTC & BAAQMD, 2006

OZONE EXCEEDANCES

The Air District's long-standing Spare the Air campaign is an episodic measure aimed at discouraging polluting behavior on days when weather conditions are conducive to high ozone levels. Because most air pollution is preventable, the Spare the Air campaign focuses on educating and encouraging the public to engage in pollution reducing activities such as driving less, taking transit, trip-linking and so forth. In this vein, a concerted effort by Bay Area businesses, government agencies, and members of the public to reduce polluting activities on Spare the Air days may in turn help to reduce the level and number of ozone exceedances or avert them altogether.

For the 2006 ozone season, the Air District issued eleven Spare the Air advisories. Free transit rides were offered on the first six Spare the Air weekdays -- June 22, 23, and 26 and July 17, 20, and 21, 2006. Key results from this year's ozone season are as follows:

- The 2006 ozone season experienced two heat waves in June and July that contributed to exceedances of the national 8-hour ozone standard on 12 days. Monitoring station sites that recorded a total of four or more exceedances of the national 8-hour standard for the season include Concord, Livermore, Los Gatos and San Martin.

- Of the six Spare the Air weekdays with free transit, no exceedance of the national 8-hour standard was recorded on June 26 and July 20. On the four other Spare the Air weekdays, the 8-hour standard was exceeded at the following monitoring station sites: Bethel Island, Concord, Fairfield, Livermore, Pittsburg, Los Gatos, and San Martin.

While hot temperatures, light winds, and strong temperatures inversions are the key reasons why the ozone levels were high (resulting in exceedances), the air quality conditions could have been much worse without the effort of the 2006 Campaign to encourage different travel behaviors and offer free transit as a mode option.

Although the Bay Area had 12 national 8-hour standard exceedances during this year's summertime ozone season, this does not necessarily mean the region will be unable to comply with the national 8-hour standard. Compliance is determined at each monitoring station using an average of the 4th highest ozone reading for three years. A violation at any monitoring station results in a nonattainment designation for the entire region because ozone is a regional pollutant. As shown in Table ES-2, the region met the national 8-hour standard for 2004 and 2005. Based on the preliminary readings, the region has demonstrated attainment of the national 8-hour standard for 2006 because the fourth highest reading does not exceed the threshold value for non-attainment.

Table ES-2: Attainment Status of the 8-Hour National Standard

Station	**Threshold Value for Non-Attainment**	**2004 4th High**	**2005 4th High**	**2006 3rd & 4th Highest Readings** (preliminary data for entire 2006 season)
Livermore	**103**	77	75	93, 89
San Martin	**113**	73	69	91, 88
Concord	**116**	74	65	88, 86
Bethel Island	**117**	70	68	81, 81
Los Gatos	**119**	74	62	85, 85

Source: BAAQMD, 2006

ACCESS TO SPARE THE AIR/FREE TRANSIT INFORMATION

- A special Spare the Air/Free Transit page on the 511.org Web site received more than 79,300 hits, with most occurring on the day before, during or after a Spare the Air episode.

- Sign ups for AirAlerts, which automatically send Spare the Air advisories to subscribers, increased by 12,000 new registrants since the June 1 start of the ozone season, bringing the total registration list to over 40,000 individuals.

- Radio, television and print media coverage about the 2006 Campaign was extensive. There were over 830 press stories specifically mentioning the 2006 Campaign, resulting in an advertising value worth over $1.2 million, which is the amount that would have been paid if the comparable television, radio or print advertising had been purchased.

PROJECT IMPLEMENTATION – TRANSIT OPERATIONS

- Operator's lost farebox revenue was completely reimbursed by MTC and the Air District.

- Transit operators stood ready to implement the free transit promotion, and the implementation was smooth for all operators except those who experienced the crowding and security issues noted below.

- Transit operators were able to expose their transit services to a new customer base, attracting new riders to use the system on a regular basis.

- Transit operators' execution of the free transit offer allowed them to identify the true capacity of their systems. This information will be useful in planning for emergency response to disasters such as an earthquake.

- The Golden Gate Transit and Alameda/Oakland Ferry operators experienced some unique challenges, testing their ability to control crowds, ensure transit security, maintain on-time performance levels, and respond to frustrated regular ferry riders. On-time performance was compromised due to the record-high number of ferry riders, resulting in serious service delays and the need to bring into service additional ferryboats on the last two Spare the Air weekdays.

- Transit security and passenger safety were key priorities for all the transit operators given the increased number of passengers on any single bus, train, or ferry boat. These challenges were particularly acute for BART during the three July Spare the Air days. Specifically, for July 21, BART police reported that calls for service were double what they would normally expect. Most of these calls occurred during the afternoon and evening hours. BART customer service also reported over a dozen customer complaints concerning the July Spare the Air days, with most complaints focused on security concerns.

- Caltrain also reported that many older adults took refuge on the trains to escape from the heat, and the high number of first-time and/or non-regular riders unfamiliar with the Caltrain system

resulted in crowding, service delays and an overall unpleasant transit atmosphere and experience for its riders.

CUSTOMER COMPLAINTS

- Some regular ferry riders complained about the overcrowding and service delays on the ferry boats due to the increased number of new riders during the mid-day and evening peak periods who took advantage of the free ride and viewed it as an e-ticket theme park ride. Some regular passengers felt that ferry rides should not be offered free all-day, or said they would rather drive on Spare the Air days than deal with the overcrowding.

- Some regular BART riders expressed concerns about security on BART, particularly those who rode on cars where groups of unruly teenagers had fights with each other or intimidated and harassed other BART riders.

- A handful of monthly pass holders using Caltrain, ACE, AC Transit, and VINE complained that they would not be reimbursed for the unused day of their monthly pass because they too felt that they should get the ride for free. In response, VINE gave out "oops" passes to their few unhappy monthly pass holders, and the Air District gave "thank you" coupons to transit operators to distribute to their monthly passholders. These includes a two-for-one admission coupon to Disney on Ice; a two-for-one admission coupon to the Ringling Bros and Barnum & Bailey Circus; and a voucher for 50 percent off a new subscription to the San Francisco Chronicle.

- Some Solano, Napa, and West Contra Costa transit riders complained that Vallejo Transit/BayLink Ferry did not participate in the 2006 campaign.

- A few transit riders complained that their bus drivers and train operators were not customer-friendly. Conversely, bus drivers and train operators complained that passengers were bombarding them with too many questions.

CUSTOMER POSITIVE FEEDBACK

- Some riders reported that they felt compelled to get out of their cars because of the Spare the Air messaging.

- Some riders felt that the Spare the Air/free transit offer saved riders money and saved the environment.

- Some riders felt that it was very good to get people to drive less and ride more even though it is not free for monthly pass holders and the buses, trains, and ferries were standing room only.

- Some riders reported that the money saved from the transit fare was redirected to spontaneous shopping and dining activities, which gave the regional economy a nice boost (see San Francisco Chronicle editorial published July 21, 2006).

IDEAS FOR NEXT YEAR'S PROGRAM

In defining the parameters for next year's Spare the Air/Free Transit Campaign, MTC and the Air District will consider the following ideas put forth by transit operators and some members of the public:

- All transit operators except those noted below suggested the continuation of the free, all-day transit offer. Specifically, VTA and other bus operators felt strongly that the free, all-day transit offer was very effective and was by far easier to implement than last year's morning commute offer.

- Golden Gate Transit suggested a "2 for 1" offer wherein passengers would buy one ferry ticket and board for free on the Spare the Air day, but save the purchased ticket for use on another day.

- BART suggested going back to just the free morning commute offer as was done in 2004 and 2005. For BART, the free morning commute offer simply did not produce the safety and security issues that resulted from the free all-day offer.

- Caltrain suggested going back to just the free morning commute offer, but would be amendable to a morning/evening commute offer. Caltrain felt that the all-day offer was not reflective of a typical commute on Caltrain, due in large part to disruptive first-time or non-regular riders, which, in effect, may dissuade riders (new and regular) from taking transit altogether. For Caltrain, commute hours offer the optimal transit experience because the problem crowds are not likely to be out and about. A positive transit experience may compel riders to continue to take transit in the future.

- Other suggestions included offering only free commutes only in the mornings on ferries, Caltrain and BART but free travel all day on all buses.

- A final suggestion was to solicit funding assistance from private sponsors.

CONCLUSIONS

The 2006 Spare the Air/Free Transit campaign successfully achieved its main goals of raising public awareness about the link between travel choice and air quality, and encouraging the public to drive less and take transit more. The most direct impacts of encouraging the public to take transit on Spare the Air days are the substantial increases in transit ridership and the associated emission reductions. Equally impressive, however, are the indirect impacts of the campaign. The 2006 Campaign established new benchmarks for both awareness and positive attitudes about air quality improvement efforts and what actions individuals can take to help keep the air clean and healthy. Increased awareness about Spare the Air spurs increases in the proportion of the population that engages in pollution reduction through other means such as foregoing trips, trip linking, and carpooling. Other indirect impacts not measured by this program evaluation include the positive public health benefits, particularly for people with respiratory conditions, and the economic impacts gained by the spontaneous shopping and dining-out activities as supported by anecdotal evidence.

DIRECT IMPACTS

Increased Transit Ridership: The 2006 Campaign encouraged people to use transit on Spare the Air days for not only work trips but also for all other work-related, medical, recreation, and other trips that occur throughout the day. Overall, the participating Bay Area transit systems carried an additional 1.3 million riders over the six Spare the Air/Free Transit weekdays, which is up 15 percent from baseline conditions. The onboard passenger surveys found that nearly 10 percent of the respondents made a conscious decision to change their travel behavior by taking transit rather than driving their car because it was a Spare the Air day.

Reduced Emissions: An estimated 2.221 tons of nitrogen oxides (NOx), 2.179 tons of reactive organic gases (ROG), and 0.852 tons of particulate matter (PM-10) *per Spare the Air day* were reduced by persuading an estimated 465,444 drivers to reduce an estimated 1.14 trips each. Collectively, drivers reduced an estimated 528,279 vehicle trips and more than 3.5 million miles of travel per Spare the Air day. Another 0.115 tons of ROG were removed *per Spare the Air day* from decreased or avoided use of consumer products. The estimated totals for emissions reduced on the six Spare the Air days are 13.33 tons of NOx, 13.07 tons of ROG, and 5.11 tons of PM-10 from trip reduction and an additional 0.69 tons of ROG were removed from decreased or avoided use of consumer products.

INDIRECT IMPACTS

Increased Trip Reductions: A greater number of Bay Area residents were compelled to change their driving behavior on Spare the Air days in the interest of protecting air quality. Ten percent of Bay Area drivers reduced at least one trip in response to the 2006 Campaign compared to just three percent prior to when the free transit element was introduced to the campaign (2003). Trip linking and eliminating a trip altogether were the most common methods of reducing one's driving. In total, for the first six Spare the Air weekdays, the 2006 Campaign eliminated over three million vehicle trips per Spare the Air day, which translates to over 21 million vehicle miles reduced in total by the campaign.

High Exposure to Spare the Air Messaging: The 2006 Campaign received unprecedented publicity via the Internet and broadcast, and print media. Seventy-six percent of survey respondents recalled being exposed to news stories or public service announcements related to air quality and/or Spare the Air. Prior to the Spare the Air/Free Transit Campaign (2003), the recalled exposure was only 54 percent.

Economic & Public Health Benefits: While this program evaluation does not assess the economic and public health benefits from the 2006 Campaign, anecdotal evidence from public comments and newspaper opinions and editorials (e.g., San Francisco Chronicle editorial published on July 21, 2006) suggests that some Bay Area residents who took advantage of the free transit rides did engage in spontaneous shopping and dining-out activities, and the emission reductions may have some direct positive public health impacts for children, the elderly, and people with respiratory issues. Furthermore, children, students and your adults took transit, some for the first time, for various trip purposes, resulting in exposure of a new population to transit.

I. INTRODUCTION

Ozone levels are usually highest on hot, windless summer afternoons, especially in inland valleys. Ozone is highly reactive, and high concentrations of ozone near the ground level can be harmful to public health. High ozone levels can aggravate respiratory conditions and damage the tissues in the lung and respiratory tract. Children, seniors and people with respiratory illnesses are most at risk to the adverse health effects of ozone.

Established in 1991, the Air District's Spare the Air outreach campaign is an intermittent, voluntary control program in which Bay Area residents, businesses and public agencies are encouraged to reduce polluting activity on days when weather conditions are conducive to high ozone levels. During the summertime ozone season, the Air District conducts episodic public education campaigns designed to educate the public about air quality and encourage them to reduce their driving and use of certain household products on days that are expected to violate federal ozone air quality standards.

Spare the Air advisories are declared on days when ground-level ozone is forecast to reach the U.S. Environmental Protection Agency's Air Quality Index (AQI) of 100, which is the "Unhealthy for Sensitive Group" category. Air District meteorologists make predictions by 1:15 pm the day before the actual Spare the Air episode. The Air District then issues Spare the Air advisories to participating individuals, employers, and agencies, as well as to press and media outlets, through AirAlert notifications and press releases. The Air District urges residents to cut back on any activities that cause pollution – such as driving and using oil-based paints, gasoline-powered lawn mowers, and household aerosol products like hair spray.

The Spare the Air campaign has been successful in its public education efforts, but the campaign was elevated to new heights in 2004 when it became directly linked to free rides on Spare the Air days. The 2004 pilot program offered free morning commutes on the first five Spare the Air weekdays on BART and LAVTA. For the two Spare the Air days during the 2004 ozone season, BART reported carrying an additional 16,000 riders on the first Spare the Air day (September 7) and some 24,000 additional riders on the second Spare the Air day (September 8). Based on the pilot program's success, the 2005 campaign continued to offer free morning commutes on the first five Spare the Air weekdays but was expanded to include 20 transit operators. Ridership increased by 7 percent (21,035 trips) for the single Spare the Air day during the 2005 ozone season (July 26).

The 2006 Spare the Air/Free Transit Campaign (2006 Campaign) seeks not only to raise public awareness of the link between transportation choices and air quality, but also to encourage Bay Area residents to change their travel behavior on high pollution days by providing them with an incentive to take transit (i.e., free all-day transit rides on participating systems). The direct impact that potentially could be realized by the campaign would be increases in transit ridership. Indirect impacts could include people engaging in some form of trip reduction through carpooling, vanpooling, biking, or walking (in addition to taking transit) as well as reducing use of consumer products like hairsprays, lighter fluid for barbeques, gas-powered garden tools, and the like. In short, the 2006 Campaign is a comprehensive transportation-air quality outreach and ozone education program, not just a free transit promotion.

II. 2006 Spare the Air/Free Transit Campaign

A. PROGRAM GOALS

The 2006 Spare the Air/Free Transit Campaign is an episodic air quality program developed specifically for implementation on days when air quality is forecasted to be unhealthy for the Bay Area. MTC and the Air District, along with our partner agencies, established three clear goals for the 2006 Campaign:

1. Increase public awareness about "sparing the air"
2. Encourage Bay Area residents to drive less and use public transit more
3. Reduce emissions to avert national 8-hour ozone exceedances

The overarching goals of the 2006 Spare the Air/Free Transit Campaign are to raise public awareness about the linkages between air quality and travel choices and to encourage the public to augment their travel behaviors by reducing driving trips (through trip linking, eliminating a trip, carpooling, walking or biking) and/or by taking advantage of the free, all-day, transit rides. If offering free fares on 26 bus, rail, and ferry systems can encourage more Bay Area residents to take transit on Spare the Air days, then this campaign may convert certain travelers to become regular transit users by virtue of giving them exposure and experience in using transit for work, shopping, recreation, and other trips. Furthermore, the Spare the Air messaging continues to emphasize other emission reductions efforts individuals can take including reducing the use of gasoline-powered lawn and garden equipment and avoiding polluting household products. In total, the emission reductions gained from all these pollution reduction activities may either avert or minimize the number of exceedance of the national 8-hour ozone standard.

In response to feedback from Bay Area transit operators and the public, unlike the 2004 and 2005 Spare the Air/Free Morning Commute campaigns, this year's incentive offered free transit all day long. The free all-day rides gave commuters the opportunity to take transit from home to work and vice versa, and it also accommodates all other work-related, school, medical, shopping, and recreation trips that occur throughout the day.

B. PARTICIPATING TRANSIT OPERATORS

Twenty-six Bay Area transit operators participated in this year's Spare the Air/Free Transit Campaign, as shown below. Starting in February 2006, MTC, Air District, and transit operator staff formed a "working group", and collaborated closely to develop a comprehensive regional marketing strategy, as well as individual operator ridership monitoring and operations plans. The 26 participating transit operators are identified below. Note that Vallejo Transit/BayLink Ferry, Capitol Corridor, and Healdsburg-in-Transit did not participate in this year's campaign.

- AC Transit
- Alameda-Harbor Bay Ferry
- Alameda-Oakland Ferry
- Altamont Commuter Express (ACE)
- BART
- Benicia Breeze

- Caltrain
- County Connection (CCCTA)
- Cloverdale Transit
- Dumbarton Express
- Fairfield/Suisun Transit
- Golden Gate Ferry and Bus (GGBHTD)
- LAVTA/Wheels
- MUNI
- Petaluma Transit
- Port of Oakland (AirBART)
- Rio Vista Breeze
- SamTrans
- Santa Rosa CityBus
- Sonoma County Transit
- Tri Delta Transit (ECCTA)
- Union City Transit
- Vacaville City Coach
- VINE
- WestCat
- Santa Clara VTA

C. SPARE THE AIR EPISODES

The 2006 summer ozone season started on June 1, 2006 and ended on October 13, 2006. This year, MTC and the Air District offered free all-day rides on 26 participating systems for the first three Spare the Air weekdays, excluding holidays. Two heat waves in June and July activated the program earlier than expected. Three Spare the Air episodes occurred on Wednesday, June 22, Thursday, June 23, and Monday, June 26, 2006. MTC and the Air District subsequently extended the campaign by three additional Spare the Air weekdays, excluding holidays. These three episodes occurred on Monday, July 17, Thursday, July 20, and Friday, July 21, 2006. In total, the Air District declared eleven Spare the Air advisories, of which only the first six Spare the Air weekdays featured the free transit rides.

III. PROGRAM EVALUATION

A. PURPOSE

The purpose of this program evaluation is to quantify the results and effectiveness of offering free transit on six Spare the Air weekdays. Key elements addressed in this program evaluation are as follows:

1. Determine the number of additional riders carried on the six Spare the Air/Free Transit days in comparison to baseline conditions;
2. Understand the travel behavior of people who responded to the campaign;
3. Assess the overall public awareness and recall of Spare the Air messaging; and
4. Estimate the amount of emissions reduced for the two ozone precursors (reactive organic compounds and nitrogen oxides).

B. METHODOLOGY

MTC and the Air District utilized the following methods to quantify the effects that the 2006 Campaign had on transit ridership levels, travel behavior, Spare the Air awareness, and emission reductions.

- Participating Bay Area transit operators collected and verified **ridership estimates** for each of the six Spare the Air days, and provided the baseline conditions, which represent the ridership counts for the same day in the previous week with a few exceptions.

- Godbe Research and Nichols Research conducted an **onboard passenger survey** during the morning and evening commute periods on five of the six Spare the Air days to quantify the direct impacts of offering free fares on transit user behavior.

- True North Research and Eric N. Schreffler, Transportation Consultants (ESTC) conducted a random digit dial **telephone survey** of Bay Area drivers on the evenings of the six Spare the Air days in June and July to quantify the effects that the Spare the Air public education program had on driving behavior, the use of selected household products, and emissions reductions during the 2006 ozone season.

- MTC posted on **online customer survey** on the special Spare the Air/Free Transit page on 511.org to determine the effectiveness of Spare the Air messaging and how people received and accessed information about the 2006 Campaign.

- **Emission reduction estimates** for the 2006 Campaign are based on the reported trip reductions from the True North Research and ESTC telephone survey using California Air Resources Board (CARB)-U.S. Environmental Protection Agency (EPA) emission factors and methodology. Furthermore, the **cost-effectiveness** of the campaign is also computed.

Additional data analysis pertaining to ridership levels on the subsequent Spare the Air weekdays with no free transit offer as well as bridge traffic volumes on Spare the Air/Free Transit Days are also provided for information purposes.

C. KEY RESULTS

TRANSIT RIDERSHIP

Participating Bay Area transit operators collected and verified ridership estimates for each of the six Spare the Air days, and provided the baseline conditions, which represent the ridership counts for the same day from the previous week (except for Muni, Caltrain, and WestCat). Methods used to collect ridership data varied amongst the operators, ranging from manual passenger counts to use of automated passenger counters to field sampling of routes and stations. Note that there is a margin of error associated with the ridership estimates due to the data collection methods used. Thus, some ridership figures may be under- or over-estimated.

Overall, the 2006 Spare the Air/Free Transit Campaign produced significant gains in transit ridership. Table 1 presents the ridership counts for a Spare the Air weekday compared to a baseline day by operator for each of the six Spare the Air days, and Figure 1 summarizes the regional totals for each Spare the Air day. Note that while we are reporting on the total ridership counts, the onboard survey results presented in the subsequent section should be referenced to determine the impact of offering free fares to encourage people to use transit on Spare the Air days who otherwise would use a private vehicle for the trip.

- Transit ridership levels rose by approximately 15 percent regionwide over the six Spare the Air days, adding a total of 1.35 million riders. This equates to an average of an additional 225,000 riders per Spare the Air day.

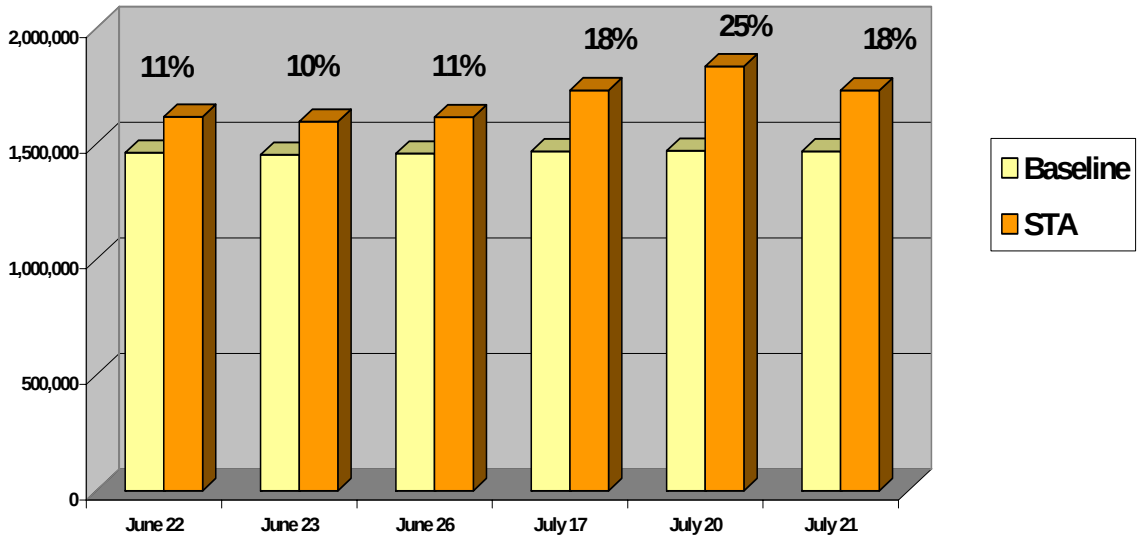
- Muni saw the highest absolute ridership gain, with close to 500,000 additional riders (up 12 percent) compared to the baseline on its system over six Spare the Air days. Muni was followed by AC Transit, which had 360,000 additional riders (up 28 percent), BART with 152,000 additional riders (up 8 percent), and VTA bus with 81,000 additional riders (up 15 percent).

- Other large bus operators saw substantial absolute ridership gains over the six Spare the Air days as well. Golden Gate Transit carried 29,000 additional riders (up 20 percent) compared to the baseline. SamTrans registered 24,000 additional riders (up 10 percent), and County Connection had 16,500 additional riders (up 21 percent). Even smaller suburban bus operators experienced substantial ridership increases. These include Tri Delta with 13,000 additional riders (up 26 percent) and WestCat with 10,000 additional riders (up 48 percent).

- Ridership levels also rose on light-rail and passenger rail services over the six Spare the Air days compared to the baseline. VTA light-rail carried an additional 46,300 riders (up 25 percent), Caltrain drew 4,000 additional riders (up 25 percent) and ACE carried 1,800 additional riders from the Central Valley into the Bay Area (up 11 percent).

- The most dramatic percentage increases in ridership levels occurred on the ferry systems. Golden Gate Sausalito Ferry led the way with a 326 percent over the six Spare the Air days, going from an average of 1,800 ferry riders per day to 7,600. The Golden Gate Larkspur Ferry also fared well, with ridership climbing 93 percent from an average of 5,200 ferry riders per day to 10,000 riders per day. Alameda-Oakland and Alameda Harbor Bay Ferries experienced a 226 percent ridership gain, going from an average of 1,800 ferry riders per day to 5,900 ferry riders per day.

Figure 1
Regional Ridership on Spare the Air Days



Baseline = Same Day from Previous Week with Few Exceptions

Source: MTC, 2006

Table 1-A: Ridership Counts on Spare the Air Days with Free Transit (June 22, 23, & 26)

	Thurs June 22	Baseline	Numeric Change	Percent Change	Fri June 23	Baseline	Numeric Change	Percent Change	Mon June 26	Baseline	Numeric Change	Percent Change
AC Transit	238,650	215,000	23,650	11%	247,250	215,000	32,250	15%	253,700	215,000	38,700	18%
ACE	3,244	2,918	326	11%	2,662	2,680	-18	-1%	3,054	3,064	-10	0%
Alameda Ferries	3,078	1,708	1,370	80%	6,935	1,832	5,103	279%	5,429	1,778	3,651	205%
BART	362,000	329,000	33,000	10%	331,000	314,000	17,000	5%	351,000	323,000	28,000	9%
AirBART	0	0	0	0%	5,959	4,640	1,319	28%	4,251	3,787	464	12%
Benicia Breeze	464	392	72	18%	608	413	195	47%	694	423	271	64%
Caltrain	1,929	1,716	213	12%	2,497	1,716	781	46%	2,159	1,716	443	26%
County Connection	15,241	13,597	1,644	12%	14,895	12,776	2,119	17%	15,981	12,709	3,272	26%
Dumbarton Express	976	943	33	3%	1,009	943	66	7%	1,224	943	281	30%
Fairfield/Suisun Transit	3,171	2,439	732	30%	3,236	2,694	542	20%	3,506	2,741	765	28%
Golden Gate Bus	27,706	25,084	2,622	10%	27,650	22,975	4,675	20%	29,024	24,195	4,829	20%
GG Ferry Sausalito	5,590	1,536	4,054	264%	6,295	2,134	4,161	195%	5,878	1,725	4,153	241%
GG Ferry Larkspur	8,637	5,159	3,478	67%	9,353	5,249	4,104	78%	8,462	4,767	3,695	78%
LAVTA	6,664	6,392	272	4%	6,459	6,056	403	7%	8,043	6,503	1,540	24%
Muni	729,251	665,375	63,876	10%	717,274	665,375	51,899	8%	685,336	665,375	19,961	3%
Petaluma Transit	608	516	92	18%	622	502	120	24%	688	643	45	7%
Rio Vista Delta Breeze	15	9	6	67%	23	14	9	64%	12	14	-2	-14%
SamTrans	44,397	42,174	2,223	5%	45,225	42,174	3,051	7%	47,693	42,174	5,519	13%
Santa Rosa CityBus	8,864	7,880	984	12%	8,992	7,574	1,418	19%	9,829	8,267	1,562	19%
Sonoma County Transit/ Cloverdale Transit	4,412	4,099	313	8%	4,361	4,060	301	7%	4,666	4,439	227	5%
Tri Delta Transit	9,395	8,853	542	6%	10,287	7,563	2,724	36%	10,490	7,617	2,873	38%
Union City Transit	1,608	1,467	141	10%	1,675	1,198	477	40%	1,781	1,256	525	42%
Vacaville City Coach	631	471	160	34%	674	567	107	19%	677	536	141	26%
VINE	2,627	2,262	365	16%	2,808	2,602	206	8%	3,328	2,867	461	16%
VTA Bus	97,786	90,427	7,359	8%	98,791	93,601	5,190	6%	115,852	89,683	26,169	29%
VTA Light Rail	36,372	29,885	6,487	22%	35,416	31,904	3,512	11%	37,545	29,615	7,930	27%
WestCAT	4,563	3,588	975	27%	4,808	3,244	1,564	48%	5,394	3,541	1,853	52%
REGIONAL TOTAL	**1,617,879**	**1,462,890**	**154,989**	**11%**	**1,596,764**	**1,453,486**	**143,278**	**10%**	**1,615,696**	**1,458,378**	**157,318**	**11%**

Notes:
1. Baseline = Same Day from Previous Week except for Caltrain, Muni, and WestCat
2. Muni: Ridership estimates for June 26 and July 21 are conservative since monitoring levels on these days were reduced due to limited staff resources
3. BART: Ridership estimates for all six days are conservative since they are based on morning commute counts
4. Alameda Ferries did not participate in campaign on Monday, July 17, 2006
5. Emery Go Round shuttle services also participated in campaign; results not shown
6. AirBART joined the program late; results not shown for the first STA day

Source: Transit Operators, 2006

Table 1-B: Ridership Counts on Spare the Air with Free Transit (July 17, 20 & 21 and 6-Day Total)

	Mon July 17	Baseline	Numeric Change	Percent Change	Thurs July 20	Baseline	Numeric Change	Percent Change	Fri July 21	Baseline	Numeric Change	Percent Change	Total 6 STA	Total 6 Baseline	Numeric Change	Percent Change
AC Transit	301,000	215,000	86,000	40%	301,000	215,000	86,000	40%	307,450	215,000	92,450	43%	1,649,050	1,290,000	359,050	28%
ACE	3,065	2,974	91	3%	3,236	2,533	703	28%	2,841	2,092	749	36%	18,102	16,261	1,841	11%
Alameda Ferries	0	0	0	0%	8,982	2,278	6,704	294%	10,706	3,181	7,525	237%	35,130	10,777	24,353	226%
BART	349,000	323,000	26,000	8%	358,000	330,000	28,000	8%	343,000	323,000	20,000	6%	2,094,000	1,942,000	152,000	8%
AirBART	4,098	3,191	907	28%	4,396	3,741	655	18%	4,615	4,419	196	4%	23,319	19,778	3,541	18%
Benicia Breeze	621	510	111	22%	646	519	127	24%	736	486	250	51%	3,769	2,743	1,026	37%
Caltrain	8,380	6,628	1,752	26%	7,746	6,628	1,118	17%	7,933	6,628	1,305	20%	30,644	25,032	5,612	22%
County Connection	16,107	13,413	2,694	20%	17,269	13,949	3,320	24%	16,323	12,831	3,492	27%	95,816	79,275	16,541	21%
Dumbarton Express	1,242	943	299	32%	1,083	943	140	15%	1,059	943	116	12%	6,593	5,658	935	17%
Fairfield/Suisun Transit	3,365	3,044	321	11%	3,670	3,065	605	20%	3,385	2,990	395	13%	20,333	16,973	3,360	20%
Golden Gate Bus	30,171	25,407	4,764	19%	30,728	24,595	6,133	25%	29,708	23,904	5,804	24%	174,987	146,160	28,827	20%
GG Ferry Sausalito	7,144	1,565	5,579	356%	9,290	1,891	7,399	391%	11,559	1,896	9,663	510%	45,756	10,747	35,009	326%
GG Ferry Larkspur	10,071	4,767	5,304	111%	11,267	5,524	5,743	104%	12,105	5,569	6,536	117%	59,895	31,035	28,860	93%
LAVTA	7,461	6,453	1,008	16%	8,515	6,784	1,731	26%	8,015	6,067	1,948	32%	45,157	38,255	6,902	18%
Muni	770,504	665,375	105,129	16%	845,026	665,375	179,651	27%	738,566	665,375	73,191	11%	4,485,958	3,992,250	493,708	12%
Petaluma Transit	690	684	6	1%	630	673	-43	-6%	759	579	180	31%	3,997	3,597	400	11%
Rio Vista Delta Breeze	9	15	-6	-40%	19	45	-26	-58%	35	14	21	150%	113	111	2	2%
SamTrans	41,469	40,683	786	2%	43,575	40,683	2,892	7%	50,325	40,683	9,642	24%	272,684	248,571	24,113	10%
Santa Rosa CityBus	9,224	8,528	696	8%	9,587	8,762	825	9%	9,667	8,128	1,539	19%	56,163	49,139	7,024	14%
Sonoma County Transit/ Cloverdale Transit	4,748	4,711	37	1%	4,953	4,413	540	12%	4,730	4,348	382	9%	27,870	26,070	1,800	7%
Tri Delta Transit	10,309	8,656	1,653	19%	11,144	9,287	1,857	20%	10,930	7,559	3,371	45%	62,555	49,535	13,020	26%
Union City Transit	1,980	1,401	579	41%	2,048	1,473	575	39%	1,876	1,361	515	38%	10,968	8,156	2,812	34%
Vacaville City Coach	723	542	181	33%	710	551	159	29%	823	551	272	49%	4,238	3,218	1,020	32%
VINE	2,322	2,515	-193	-8%	2,669	2,435	234	10%	2,994	2,873	121	4%	16,748	15,554	1,194	8%
VTA Bus	104,541	95,387	9,154	10%	106,439	87,140	19,299	22%	107,391	93,587	13,804	15%	630,800	549,825	80,975	15%
VTA Light Rail	42,471	32,069	10,402	32%	40,824	31,505	9,319	30%	42,023	33,348	8,675	26%	234,651	188,326	46,325	25%
WestCAT	5,207	3,470	1,737	50%	5,217	3,460	1,757	51%	5,428	3,387	2,041	60%	30,617	20,690	9,927	48%
REGIONAL TOTAL	**1,735,922**	**1,470,931**	**264,991**	**18%**	**1,838,669**	**1,473,252**	**365,417**	**25%**	**1,734,982**	**1,470,799**	**264,183**	**18%**	**10,139,913**	**8,789,736**	**1,350,177**	**15%**

Notes:
1. Baseline = Same Day from Previous Week except for Caltrain, Muni, and WestCat
2. Muni: Ridership estimates for June 26 and July 21 are conservative since monitoring levels on these days were reduced due to limited staff resources
3. BART: Ridership estimates for all six days are conservative since they are based on morning commute counts
4. Alameda Ferries did not participate in campaign on Monday, July 17, 2006
5. Emery Go Round shuttle services also participated in campaign; results not shown
6. AirBART joined the program late; results not shown for the first STA day

Source: Bay Area Transit Operators, 2006

TRANSIT RIDERSHIP ON SPARE THE AIR DAYS WITH NO FREE TRANSIT

The Air District issued 11 Spare the Air advisories during the 2006 summertime ozone season, and free fares were offered on the first six Spare the Air weekdays. No free transit rides were offered thereafter. Three subsequent Spare the Air weekdays occurred on July 24, September 1, and September 12. For information purposes, MTC collected ridership data from the participating transit operators to gauge if Bay Area residents continued to take transit on Spare the Air weekdays even without the free transit rides.

Looking at the region as a whole, there was a 3 percent ridership gain on July 24 and September 1, and a 1 percent increase on September 1. Note that September 1 is the Friday before Labor Day, which could explain why there were dips in ridership for some systems. On July 24, the Alameda/Oakland and Golden Gate ferries recorded a significant gain in ridership levels, and BART, Dumbarton Express, VTA and smaller bus operators experienced increases in their ridership counts. On September 1, the ferries' ridership counts declined, but bus operators like County Connection, Golden Gate Transit, Fairfield/Suisun Transit, LAVTA, SamTrans, Santa Rosa CityBus, WestCat, and others saw ridership gains on their systems. The most notable ridership gains on September 12 occurred on County Connection, Golden Gate's Sausalito Ferry Service and Union City Transit. While there is no distinct overall trend about ridership levels on Spare the Air days when no free fares are offered, it is noteworthy that many transit systems — particularly bus and ferry operators — experienced ridership gains compared to baseline conditions on Spare the Air days when transit is not free.

Table 2: Ridership Counts for Spare the Air Days with No Free Transit

	Mon July 24	Baseline: Mon July 10	Numeric Change	Percent Change	Fri Sept 1	Baseline: Fri Aug 25	Numeric Change	Percent Change	Tues Sept 12	Baseline: Tues Sept 5	Numeric Change	Percent Change
AC Transit	215,000	215,000	0	0%	242,950	215,000	27,950	13%	217,150	215,000	2,150	1%
ACE	2,990	2,974	16	1%	2,720	2,261	459	20%	3,411	2,820	591	21%
Alameda Ferries	2,600	1,829	771	42%	1,956	2,841	-885	-31%	2,507	1,596	911	57%
BART	337,585	317,187	20,398	6%	344,392	355,905	-11,513	-3%	350,415	344,309	6,106	2%
Benicia Breeze	496	436	60	14%	553	492	61	12%	540	550	-10	-2%
County Connection	12,717	13,413	-696	-5%	7,944	8,829	-885	-10%	8,158	6,011	2,147	36%
Dumbarton Express	1,020	943	77	8%	919	943	-24	-3%	1,055	943	112	12%
Fairfield/Suisun Transit	2,510	3,044	-534	-18%	3,334	2,474	860	35%	3,372	3,740	-368	-10%
Golden Gate Bus	25,060	25,407	-347	-1%	25,492	24,361	1,131	5%	26,367	25,545	822	3%
GG Ferry Sausalito	2,594	1,565	1,029	66%	1,424	1,913	-489	-26%	1,490	1,205	285	24%
GG Ferry Larkspur	5,404	4,767	637	13%	4,898	5,155	-257	-5%	5,141	4,967	174	4%
LAVTA	6,191	6,453	-262	-4%	8,099	6,833	1,266	19%	8,451	8,396	55	1%
Petaluma Transit	575	684	-109	-16%	607	636	-29	-5%	655	698	-43	-6%
Rio Vista Delta Breeze	16	21	-5	-24%	21	16	5	31%	21	17	4	24%
SamTrans	42,031	40,683	1,348	3%	52,038	46,771	5,267	11%	51,355	52,480	-1,125	-2%
Santa Rosa CityBus	7,942	8,556	-614	-7%	10,190	9,282	908	10%	10,371	10,488	-117	-1%
Sonoma County Transit/ Cloverdale Transit	4,332	4,711	-379	-8%	5,189	4,379	810	18%	5,275	5,407	-132	-2%
Tri Delta Transit	7,744	8,656	-912	-11%	8,897	8,330	567	7%	10,248	10,162	86	1%
Union City Transit	1,521	1,401	120	9%	1,619	1,321	298	23%	1,707	1,595	112	7%
Vacaville City Coach	476	556	-80	-14%	798	654	144	22%	772	823	-51	-6%
VTA Bus	100,489	95,386	5,103	5%	102,881	102,019	862	1%	109,458	113,200	-3,741	-3%
VTA Light Rail	32,117	32,069	48	0%	28,309	33,380	-5,071	-15%	26,044	29,097	-3,053	-10%
WestCAT	3,806	4,132	-326	-8%	4,894	3,658	1,236	34%	5,224	5,331	-107	-2%
REGIONAL TOTAL	**821,806**	**795,388**	**26,418**	**3%**	**860,124**	**837,453**	**22,671**	**3%**	**849,187**	**844,380**	**4,808**	**1%**

Note: No ridership data available for VINE, Caltrain, and Muni.

Source: Transit Operators, 2006

ONBOARD PASSENGER SURVEY RESULTS

MTC commissioned Godbe Research and Nichols Research to conduct onboard passenger surveys to quantify the impact of offering free transit during Spare the Air weekdays. Transit routes to be surveyed were identified by Godbe Research, in consultation with MTC and participating transit agencies. The survey instrument was self-administered surveys (see Godbe Research's 2006 Spare the Air Campaign Onboard Passenger Survey (August 2006)). Surveys were conducted on June 22, 23, and 26 and July 20 and 21, 2006 between 7 am to 9 am, 4 pm to 6 pm, and 7 pm to 9 pm. In total, 6,744 passengers were interviewed for this study. Based on the analysis of the survey data, the key findings are as follows:

Trip Origin and Destination

- The majority of respondents started their trip either at home (56 percent) or at work (27 percent). Similarly, the same two responses were the destination for most respondents (work equals 43 percent, home equals 28 percent).

Mode of Arrival to Transit

- Forty-three percent of the respondents reported that walking was their mode of arrival to the bus, train, or ferry stop/station, while 21 percent drove, 19 percent transferred from other transit, nine percent were dropped off, and three percent carpooled.

Typical Mode of Transportation

- Sixty-two percent of the respondents indicated that they typically use public transit to make the trip they were on. Twenty-three percent indicated that they typically use a car, six percent walk, three percent carpool, and two percent ride a bike as their typical mode of transportation. In total, 26 percent typically use a car for their trip.

Spare the Air Awareness

- Over two-thirds of the respondents, 68 percent, were aware that it was a Spare the Air Day.

- Twenty-three percent reported that they rode public transit specifically because it was a Spare the Air/Free Transit day, while the remaining 78 percent normally use transit.

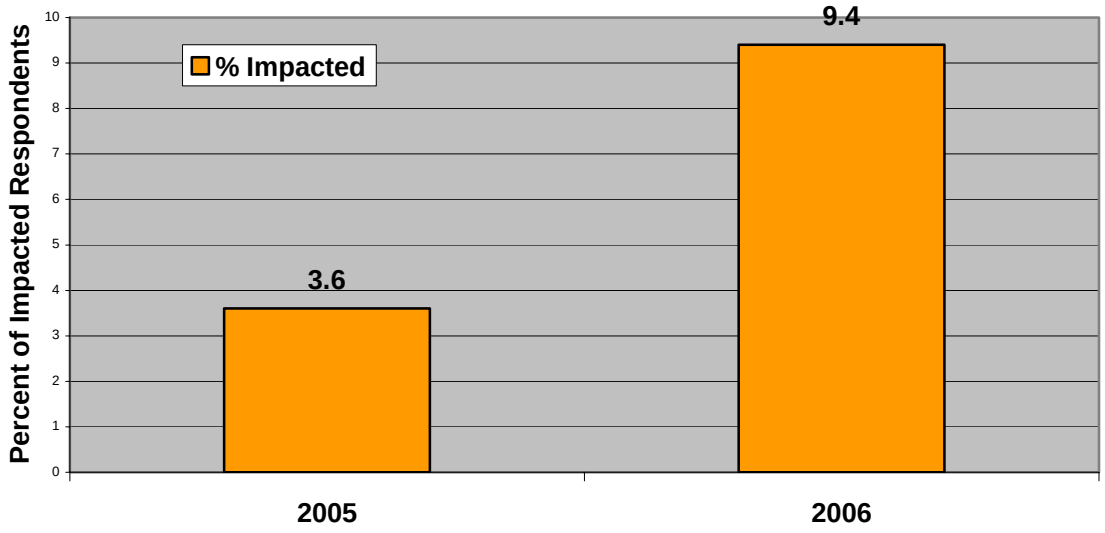
Impact of Spare the Air

In order to calculate the Spare the Air impact, an "impacted" respondent was defined as someone who noted being aware it was a Spare the Air day, took public transit as a result, and typically used a car as their primary mode of transportation. In other words, an impacted respondent made a conscious decision to change their travel behavior by taking transit rather than driving their car because it was a Spare the Air day.

- The result of this impact calculation showed that 9.4 percent of the respondents were "impacted."

When comparing this year's survey results to the 2005 Spare the Air/Free Morning Commute Campaign survey results, there was 7-percentage point increase in the Spare the Air awareness – from 61 percent in 2005 to 68 percent in 2006. More importantly, the share of "impacted" respondents rose from 3.6 percent to 9.4 percent, as shown in Figure 2.

Figure 2
Rode Transit Rather than Drive Because of Spare the Air



Source: Godbe Research, 2006

TELEPHONE SURVEY RESULTS

The True North Research and Eric N. Schreffler, Transportation Consultants (ESTC) team was commissioned by the Air District to conduct telephone surveys to gauge the effectiveness of the Spare the Air education and outreach program and understand the public's attitudes and behavior in response to the 2006 Spare the Air/Free Transit Campaign. Telephone surveys were conducted in the evening on each of the first six Spare the Air weekdays of the 2006 ozone season. In total, 1,250 randomly selected drivers within the Air District's boundaries participated in the telephone survey. The key findings are outlined below.

Driving Behavior on Spare the Air Days

- The average number of car trips taken on a Spare the Air day in 2006 was 2.35.
- Individuals who reduced at least one trip for air quality reasons reported taking an average of 2.18 trips.
- Nearly ten percent (9.84 percent) of Bay Area drivers reduced at least one trip in response to the 2006 summer season Spare the Air campaign.
- The most common method of reducing one's driving was linking trips, followed by eliminating a trip, rather than by changing their mode of travel.
- Shopping trips and trips to and from work were the most common types of trip reduced for air quality reasons in 2006.

Product Usage on Spare the Air Days

- Of the household products and equipment tested that are harmful to air quality, the most commonly used were household cleaner sprays (46 percent), cologne or perfume (34 percent), and air fresheners (22 percent).

- Overall, 3.32 percent of Bay Area drivers reduced their use of at least one product due to the Spare the Air campaign in 2006.

- In terms of products that respondents normally use but choose not to for air quality reasons in response to the Spare the Air campaign, lighter fluid, furniture polish and aerosol hairspray were the most frequently mentioned.

Recall And Awareness of Spare The Air Messaging

- Seventy-six percent (76 percent) of respondents indicated that they recalled being exposed to news stories or public service announcements related to air quality and/or Spare the Air in the two days prior to the interview.

- The most commonly mentioned sources of information about Spare the Air included television, radio and newspaper.

- Nearly two-thirds (66 percent) of all respondents were aware that the day of the interview was a Spare the Air day.

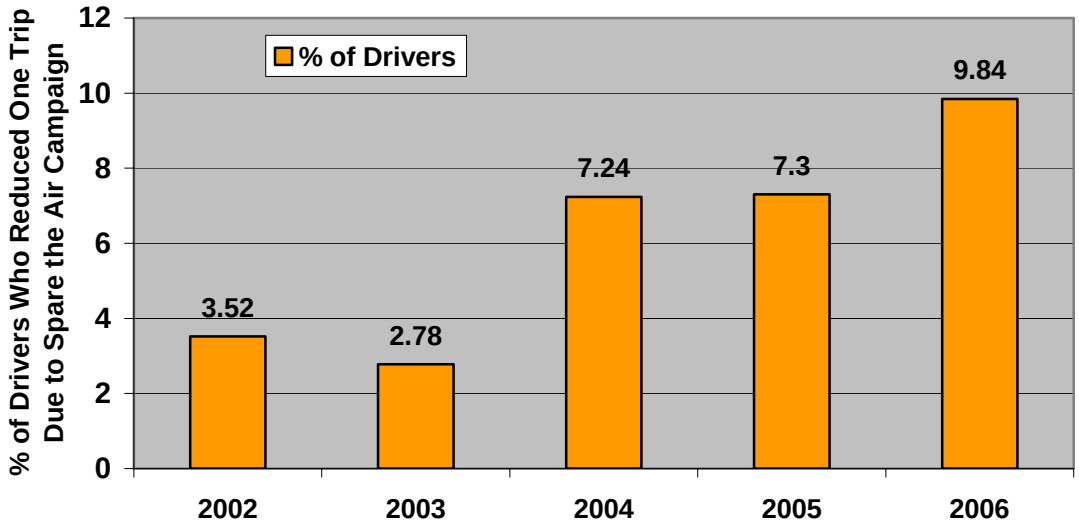
- Nearly two-thirds of respondents were also aware that commuters were able to ride public transit for free on the day of the interview (STA day).

- One percent of all drivers in the Bay Area sample chose to ride transit on a Spare the Air day because it was free – not because they normally ride transit.

- Nearly half (49 percent) of drivers indicated that they would be more likely to ride transit on a Spare the Air day if it were always free on these days.

Linking the Spare the Air public education program with the free transit offer has dramatically increased the recalled exposure to Spare the Air messaging – from 54 percent in 2003 (prior to the free transit program) to more than 75 percent in 2006. Further, the percentage of drivers who were aware of the program has increased steadily since the inception of the Spare the Air/Free Morning Commute Campaign in 2004 – to 65.6 percent driver awareness of Spare the Air in 2006 from to 52.7 percent in 2005 and 51.0 percent in 2004. Similarly, the percentage of drivers who reduced at least one trip due to the Spare the Air campaign has increased more than 350 percent since the introduction of the free transit program – from 2.78 percent in 2003 to 9.84 percent in 2006, as shown in Figure 3.

Figure 3
Spare the Air Driving Reducers (2002 to 2006)



Source: True North Research & ESTC, 2006

511.ORG CUSTOMER SURVEY RESULTS

MTC's 511 traveler information service provided the public with details on the 2006 Campaign and transit trip planning. Floodgates were featured on the 511 phone to alert users of the Spare the Air advisories and the free transit promotion. Callers were instructed to visit 511.org for more information or to plan their trip on transit. Additionally, the 511.org Web site hosted a special page linked from a promo box on the home page that provided information in both English and Spanish about the 2006 Campaign, as well as links to the Air District's and participating transit operators' Web sites. This special page also featured an online user survey to gauge Spare the Air awareness.

Announcements about the program and Spare the Air advisories were placed on the 511 Traffic and Transit pages. These announcements were linked to the special page for detailed information. Notably, the Air District's sparetheair.org Web site, as well as the participating transit operators' sites, also provided information about the campaign. Special online banners were created for transit operators to use on their websites to link to the special page on 511.org.

The special 2006 Spare the Air/Free Transit page had 79,300 hits and nearly 63,000 visits during the two months that it appeared on 511.org. The special page was available for viewing from May 25 to June 26, taken down after the third Spare the Air day and replaced with a promo box for users to fill out a customer survey about the free transit promotion. The special Spare the Air/Free Transit page was re-posted from July 12 to July 22 when the program was extended by three Spare the Air/Free Transit weekdays. For purposes of this usage analysis, hits are requests by the browser for a particular page or item on the page, while visits are the number of times that users access the site. A majority of the hits and visits to the Spare the Air/Free Transit page occurred from June 21 through June 26, and then again from July 16 through July 21, 2006. The high user-volume between these periods corresponds directly to the actual Spare the Air weekdays in June and July (see Figure 4).

The 511.org online user survey was posted on the first Spare the Air weekday (June 22) and was available until after the last Spare the Air weekday (July 22). Over 1,260 users responded to this online survey. The key results are as follows:

Typical Mode of Transportation

- Over half of the respondents indicated that they typically use public transit to make the trip they were on. Thirty-six percent indicated that they typically use a car and three percent reported carpooling as their typical mode of transportation. In total, 497 respondents, or 39 percent, typically use a car for their trip.

Spare the Air Awareness

- Over two-thirds of the respondents, 76 percent, were aware that it was a Spare the Air Day. Fifty percent reported that they rode public transit specifically because it was a Spare the Air day.

Information Sources

- Television, radio, and newspaper stories were the primary ways that respondents first heard about the 2006 Spare the Air/Free Transit Campaign (39 percent). Sixteen percent heard about the campaign through word of mouth, 13 percent from 511.org and five percent from sparetheair.org.

- When searching for the 2006 Spare the Air/Free Transit Campaign on the internet, almost two-thirds of the respondents visited 511.org (74 percent), while 16 percent visited sparetheair.org.

511.org Experience

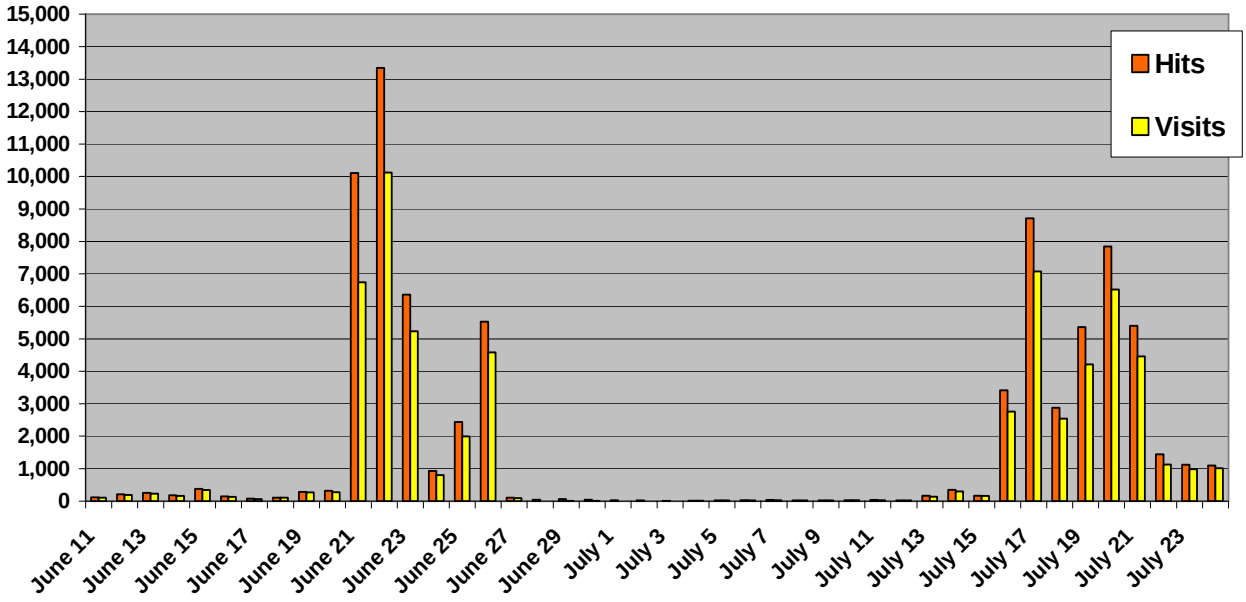
- While viewing the special Spare the Air/Free Transit page on 511.org, respondents indicated that the main reason for visiting this page was to get an overview of the free transit promotion (38 percent), followed by transit trip planning (30 percent), traveler information (12 percent), and air quality information (8 percent).

- Eighty-five percent of the respondents reported being satisfied with their overall experience when seeking the free transit information on 511.org.

AirAlerts

- When asked about the Air District's AirAlerts, 30 percent indicated that they signed up for AirAlerts. The most common alert method chosen was email (89 percent), followed by cell phone (9 percent) and pager (2 percent).

Figure 4
511.org User Summary



Source: MTC, 2006

ADVERTISING, MEDIA & EMPLOYER PROGRAM RESULTS

Advertising

The Air District led the advertising, media and employer program efforts. The 2006 Spare the Air/Free Transit Campaign officially launched via a television commercial featuring a fully wrapped Golden Gate Transit bus and U2's "Beautiful Day" song. This commercial was first aired during the *American Idol's* season finale. It was subsequently aired in 731 contracted cable spots between June 6 and July 31. Cable networks included in the buy were CNN, TNT, Cartoon Network, Animal Planet and Fox News. In addition, 133 radio ads also aired on KLLC, KCBS, KGO, KFOG, KOIT, KKIQ, as well as on Chinese and Spanish language stations, between June 1 and July 31. The ethnic advertising began in July on KTSF-TV, Telemundo (Spanish), and KVTO-AM (Chinese).

Fifteen wrapped buses served as rolling advertisements for the 2006 Campaign. The wrapped buses were in service starting on June 1 and then unwrapped shortly after the sixth Spare the Air day, which occurred on July 21. Unlike previous years, BART trains were not wrapped because BART had previously secured a wrap-advertising contract with Travelocity and did not wish to permit other wraps during that campaign.

Given the tremendous use of the Internet to access information, the Air District also conducted a geo-targeted AdWords campaign with Google, which began on June 10 and ended in October. This keyword drive campaign delivered 122,000 impressions and resulted in over 2,600 users connecting to the Air District's website – all at a bargain cost of under $900. Geo-targeted leaderboard and skyscraper ads ran on Fandango.com through the month of June, resulting in exceeding one million

contracted page visits by the public. The advertising buy included three side-of-the-highway billboards on US 101, I-580, and I-880.

Media Relations

Broadcast, print and Internet coverage for the 2006 Campaign was unprecedented. During the Spare the Air episodes in June, Air District and MTC staff conducted over 40 interviews in a 72-hour period. There were over 830 press stories specifically mentioning the free fares offer, including mention in the Toronto Star (July 18). The cost of purchasing a comparable level of television, radio or print advertising is estimated to be more than $1.2 million.

Employer Program

To kick off the Spare the Air season, and present the challenges and opportunities of running a Spare the Air employer-based partnership, the Spare the Air Employer Program team coordinated a workshop on June 1. Hosted by UCSF, a Spare the Air employer member, the workshop was attended by almost 30 representatives from public and private employers across the Bay Area. These include Oracle, Safeway, Juniper Networks, NASA Ames Research Center, PG&E, United Airlines, Genentech, Kaiser, 511 and CPMC. Throughout the month of June, the Employer Program team coordinated logistics to distribute the incentives that were secured for monthly transit pass holders and employer partners: Agilent in Santa Rosa, Yahoo in Santa Clara, Sandia Labs in Alameda County and UCSF in San Francisco. The incentives were: (1) San Francisco Chronicle – secured 50 percent off discount of subscriptions, (2) Ringling Bros and Disney on Ice (Feld Entertainment) – secured 100,000 discount coupons for shows through the summer season.

EMISSION REDUCTIONS

Emissions Methodologies and Results

The 2006 Campaign produced a number of direct and indirect impacts by educating the public about transportation-air quality linkages, and encouraging residents to take free transit for their trips instead of driving. The most salient direct impact is the emissions reduced by increasing transit ridership on Spare the Air days. Other impacts that are often overlooked are the emissions reduced indirectly by raising awareness and encouraging other types of trip reductions including carpooling, vanpooling, trip linking, biking and walking — or, eliminating trip(s) altogether. Other indirect impacts of the 2006 Campaign include emissions reductions created by lower use of consumer products such as aerosol hairsprays, lighter fluid for barbeques, gas powered garden equipment and the other polluting products on Spare the Air days.

As part of this program evaluation, we used different methodologies to quantify the emission reductions from the 2006 Campaign. MTC focused on quantifying the emissions reductions that are due to the direct impacts on transit ridership. Therefore, we did not measure the indirect impacts for many other positive travel behaviors and impacts. Our estimates of the emissions benefits from the 2006 Campaign are based on the numeric changes in transit ridership levels as reported by the participating transit operators. We applied the latest CARB emission factors and discounted the emissions benefits from transit trips that involve a car trip (i.e., rider drove and parked at a station or was dropped off at a station).

It is important to note that this transit ridership-based emissions calculation methodology has its limitations. It infers that all the ridership gains were caused by the Spare the Air campaign. This is not the case since the onboard survey results found that 78 percent of those surveyed normally take

transit while 23 percent decided to take transit because it was free. Furthermore, in terms of the campaign's impact on travel behavior, only 10 percent of the survey respondents made a decision to forego their cars and take transit because of Spare the Air. Further refinements to the onboard survey methodologies may help to address the limitations of using a transit ridership-based emissions calculation methodology.

Based on the transit ridership-based emissions calculations, we found that a total of 4.23 tons of NOx, 3.86 tons of ROG, and 0.27 tons of particulate matter (PM-10) emissions were reduced for the six Spare the Air days. This equates to 0.71 tons of NOx, 0.64 tons of ROG, and 0.05 tons of PM-10 per Spare the Air day.

The Air District's consulting team of True North Research and ESTC used a different approach to quantify the impacts associated with the full range of direct and indirect impacts of the 2006 Campaign. A total of 1,250 randomly selected drivers within the Air District's boundaries were polled in a telephone survey on the evening of one of the six Spare the Air days. Probability-based sampling techniques and monitoring of the demographics resulted in a sample that is representative of the driver population within the Air District (see True North Research and ESTC's Spare the Air 2006 Summer Ozone Season Report (October 2006) for more details). This method queries respondents about their travel behavior on the day of the survey (i.e., on a Spare the Air day, not about changes over the entire summer) and any changes they might have made in trip-making. This approach uses CARB-EPA method that is nationally recognized as the best practices method for estimating the emissions reductions due to episodic air quality public education campaigns.

Similar to the transit ridership-based emissions calculations methodology, this telephone survey-based methodology has its own limitations. This method is not the appropriate tool to measure the direct impact of the 2006 Campaign on transit ridership because the sample population was centered on Bay Area drivers and their travel behavior changes, and therefore included few people who took transit. Nevertheless, this method does measure the indirect impacts of the 2006 Campaign (i.e. its impact on awareness of Spare the Air), which in turn leads to increases in trip reductions through other means other than transit.

Based on the survey-based emissions calculations, True North Research and ESTC estimate that the 2006 Campaign reduced an estimated 2.221 tons of nitrogen oxides (NOx), 2.179 tons of reactive organic gases (ROG), and 0.852 tons of particulate matter (PM-10) per Spare the Air day by persuading 465,444 drivers to reduce an estimated 1.14 trips each (see Table 3). Collectively, drivers reduced an estimated 528,279 vehicle trips and more than 3.5 million miles of travel per Spare the Air day. Another 0.12 tons of ROG were removed per Spare the Air day from decreased or avoided use of consumer products. The estimated totals for emissions reduced on the six Spare the Air days are 13.33 tons of NOx, 13.07 tons of ROG, and 5.11 tons of PM-10 from trip reduction and an additional 0.69 tons of ROG were removed from decreased or avoided use of consumer products.

Table 3: Estimated Emission Reduction Results

	2006	2005	2004	2003	2002
Regional Driving					
Estimated Drivers	4,730,127	4,730,127	4,835,726	4,750,000	4,750,000
Proportion of Reducers	9.8%	7.3%	7.2%	2.8%	3.6%
Total Reducers	465,444	345,299	348,244	133,000	171,000
Average Trip Reduced (adjusted)	1.14	1.00	1.16	1.04	1.46
Average Trip Length in Miles (Commute)	11.6	11.6	11.6	13.7	13.7
Average Trip Length in Miles (All Trips)	5.0	5.0	5.0	5.37	5.37
Trips Reduced	528,279	345,299	403,963	138,054	249,600
Miles of Travel Reduced	3,509,915	2,173,176	2,595,705	959,584	1,610,708
Travel Impacts					
Daily NOx Reduction (tons)	2.221	1.525	2.023	0.833	1.776
Daily ROG Reduction (tons)	2.179	1.483	1.945	0.772	1.860
Daily PM10 Reduction	0.852	0.525	0.627	0.230	0.400
Spare the Air Days	6	1	2	7	7
Total NOx (tons)	13.326	1.5	4.0	5.8	12.4
Total ROG (tons)	13.074	1.5	3.9	5.4	13
Total PM-10 (tons)	5.112	0.5	1.3	1.6	2.8
Consumer Products Impacts					
Daily ROG	0.115	0.18	0.23	0.20	0.24
Spare the Air Days	6	1	2	7	7
Total ROG Reduction (tons)	0.69	0.18	0.46	1.42	1.68

Source: True North Research & ESTC, 2006

Ideally, if we could reconcile the two separate methodologies, the resulting emissions reductions benefits could be combined to provide a more complete picture of both the direct and indirect impacts of the 2006 Campaign. Absent such a scenario, MTC and Air District staff agreed to use the emissions benefits calculated by True North Research and ESTC because this method is based on a CARB-EPA methodology for quantifying the impacts of ozone action public education programs and it best captures the range of trip reductions due to Spare the Air (including taking transit).

It is important to note that the results presented in Table 3 are comprehensive for the emissions reduced due to the Spare the Air/Free Transit Campaign for the six Spare the Air weekdays. However, there are ongoing impacts of the program that have not yet been measured by either approach. For example, a person may try transit because it is free on a Spare the Air day, and then continue riding transit in the future. Research is now underway to identify ways to quantify both the episodic and ongoing emissions impacts due to the public education programs like the 2006 Campaign.

Comparison to Other State TCMs

The emission reductions from the 2006 Campaign are remarkable, and become particularly significant when compared to other Transportation Control Measures (TCMs) adopted as part of

the 2005 Ozone Strategy (see Table 4). The 2006 Spare the Air/Free Transit Campaign far higher levels of emission reductions of the two ozone precursor pollutants than all other the Transportation Control Measures (TCMs). The emissions reductions from TCM 1 (voluntary trip reduction) and TCM 3 (improve local bus service) are good, but TCM 16 (Spare the Air/Free Transit) remains superior.

Table 4: Emission Reductions of State Transportation Control Measures

TCM #	TCM Description	ROG Reductions (tons/day) 2006	NOx Reductions (tons/day) 2006
1	Support Voluntary Employer Based Trip Reduction Programs	0.53	0.57
3	Improve Local and Areawide Bus Service	0.42	1.13
4	Improve Regional Rail Service	0.23	0.21
5	Improve Access to Rail and Ferries	0.17	0.15
6	Improve Interregional Rail Service	0	0
7	Improve Ferry Service	0	0
8	Construct Carpool/Express Bus Lanes on Freeways	0	0
9	Improve Bicycle Access and Facilities	0.04	0.03
10	Youth Transportation	0.11	0.09
11	Install Freeway Traffic Management System	0.04	0.11 – 0.12
12	Arterial Management Measures	0.06 – 0.12	0.06 – 0.11
13	Transit Use Incentives	0.02 –0.12	0.02 – 0.10
14	Carpool and Vanpool Services and Incentives	0.01	0.01
15	Local Land Use Planning & Development Strategies	0.09	0.14
16	**Public Education/Intermittent Control Measures***	**2.29**	**2.22**
17	Conduct Demonstration Projects	0	0
18	Transportation Pricing Reform	0	0
19	Improve Pedestrian Access and Facilities	0.04	0.02
20	Promote Traffic Calming	0	0

*For the 2005 Ozone Strategy, the emission reduction figures for TCM 16 were calculated in tons per day based on emissions reduced on Spare the Air days, which occur approximately 7 days per year. The ROG emission reductions are 1.0 tons/day and NOx are 2.0 tons/day. For purposes of this evaluation, the actual emission reductions for the 2006 Spare the Air/Free Transit Campaign are shown in this table.

Source: 2005 Ozone Strategy

Cost Per Ton of Emissions Reduced

How cost-effective is the 2006 Spare the Air/Free Transit Campaign in reducing pollutant emissions? To determine the program's cost-effectiveness, the total cost for the 2006 campaign is divided by the sum of the reactive organic gases, nitrogen oxides and particulate matter emissions reduced. The program cost is $13.2 million, and the emission reductions are 32.2 tons of ROG, NOx and PM-10 combined for the six days. So, the cost-effectiveness estimate is $410,800 per ton of emissions reduced. Note that we used a conservative estimate of the emissions reduced so the cost per ton reduced may be much less if we are able to capture the full range of emissions reductions due to the campaign. As shown in Table 5, the 2006 Spare the Air/Free Transit Campaign produces the largest emissions reductions by far, but is much less cost-effective compared to other air quality strategies.

Table 5: Comparative Summary of Various Bay Area Air Quality Strategies – Costs, Emission Reductions, and Cost-Effectiveness

Project	Program Cost	Emission Reductions (tons/day)	Cost Per Ton Emissions Reduced*
Vehicle Buy Back Program *Pay $650 to owner and scraps an operational and registered 1985 or older vehicle*	$7.36 million	1.0	$7,300
Urban Bus Retrofit Program *Retrofit 1,700 diesel buses from 13 Bay Area transit agencies with emission control devices*	$30.7 million	1.43	$8,000
Solid Waste Collection Vehicle Program *Install emission control devices on 218 diesel refuse trucks and purchase 20 new natural gas refuse trucks*	$3.1 million	0.04 for natural gas trucks, 0.12 for truck retrofit	$12,000 for natural gas trucks, $16,600 for truck retrofit
Regional Arterial Signal Timing *Provide consultant assistance to cities/counties to update traffic signal coordination plans*	$1.076 million	0.023	$41,000
Regional Rideshare Program *Provide carpool/vanpool formation assistance and information on transportation alternatives*	$2.85 million	0.18	$44,000
Vehicle Incentive Program *Provide grant to public agencies to acquire low emission, light-duty alternative fuel vehicles*	$0.5 million	0.046	$56,348
LNG infrastructure Project *Purchase liquefied natural gas (LNG) hostler and retrofits 9 diesel trucks with LNG*	$3.0 million	0.48 for hostler, 0.0013 for trucks	$6,000 for hostler, $453,260 for trucks
Spare the Air/Free Transit Campaign *Offer free fares on six Spare the Air weekdays on participating transit systems*	$13.2 million	4.51	$410,800
State TCM 3: Improve Local and Areawide Bus Service* *Improves and expands enhanced bus, bus rapid transit, and regional express bus services*	$480.0 million	0.28	$823,000
State TCM 5: Improve Access to Rail and Ferries* *Implements Safe Routes to Transit and RM2 Transit Connectivity Study recommendations, develops demonstration station car and bike station concepts, and explores shuttle options*	$185.0 million	0.11	$2.3 million
State TCM 4: Upgrade and Expand Local and Regional Rail Service* *Upgrade BART, Muni, VTA, Caltrain, etc.*	$12.2 billion	0.54	$6.3 million

*Cost-effectiveness estimate is based on total project cost.
**Assumes 2015 implementation year for State TCMs from 2005 Ozone Strategy

Source: MTC & BAAQMD, 2006

Examples of Ozone Action Public Education Programs

For information purposes, a summary of other similar ozone-transit programs that are implemented in California and elsewhere in the country is provided below. If available, the program costs, emission reductions, and cost-effectiveness results are also reported.

- **Yolo County's Free Rides on Spare the Air Days Program**: Since 2005, YOLOBUS and Unitrans, the two transit systems serving Yolo County, have offered free fares on Spare the Air Day. No program results data available.

- **Placer County's Spare the Air-Free Fare Program**: Since 2005, the Placer County Transportation Planning Agency has offered free fares on fixed route or commuter bus services in the county, including Auburn Transit, Lincoln Transit, Roseville Transit, and Placer County Transit. Funding for the program comes from a $40,000 Clean Air Grant from the Placer County Air Pollution Control District. No program results data available.

- **Northern Virginia's Code Red Ozone Action Days**: Since 1999, the Northern Virginia Transportation Commission has administered Code Red Ozone Action Days, where fare collection is suspended on Northern Virginia bus services on Code Red Days. The program is funded using CMAQ funds. In 2002, with 12 forecasted Code Red Days, 32,000 new riders were added at a cost of $671,000. This produced 0.218 tons of ROG and 0.283 tons of NOx, for a total of 0.5 tons. The cost-effectiveness of this program was $1.34 million per ton. In 2003, only two Code Red Days were declared, resulting in a ridership gain of 41,000. The program cost was $140,000, yielding a cost-effectiveness of $179,000 per ton. Note that the program cost cited here only reflects the fare recovery to the transit operators, and does not include other program costs like marketing, program evaluation, and so forth (which is fully reflected in the Spare the Air/Free Transit Program cost-effectiveness calculation). The program is still running, but no other program evaluations have been conducted since very few Code Red Days have been declared.

- **Delaware's Ozone Action Transit Partners Program**: Since 2004, the Transportation Management Association of Delaware (TMA Delaware) has administered the Ozone Action Transit Partners Program on behalf of DART First State and Rideshare Delaware Program. The Ozone Action Transit Partners Program is designed to educate commuters about the effects of ozone and provide free bus passes to employees to use between May and September. A total of 160 employers registered for the 2005 program, registering 4,347 employees. In all, 18,761 bus passes were used for a total of 38,204 trips (passes can be used for multiple trips within a given day). This program remains active.

- **Kansas City Region's 25-Cent Ozone Alert! Fare**: Since 2001, the Kansas City Area Transportation Authority (ATA) has offered 25-cent fares on The Metro when an Ozone Alert! is issued. For the first three years of the program, an average of $250,000 in CMAQ funds were used to reimburse the Kansas City ATA for part of the revenue loss and marketing expenses. Since 2004, funding was applied only towards the marketing expenses. The 2006 program began on June 1 and ended on September 30, and the 25-cent fares were available on Ozone Alert! days occurring on both weekdays and weekends. Monthly pass holders received coupons to receive $2 off the price of a regular or express monthly pass, and reduced fare bus pass users got a $1 discount with the coupon. For the 2006 ozone season, 13 Ozone Alert! days were declared

during the months of July and August. Kansas City ATA reported that the Ozone Alert! Days boosted ridership levels by 47,000 riders during the month of July, which had 11 of the 13 Ozone Alert! Days at a cost of $12,145 for the reduced fares.

- **Southwest Ohio Regional Transit Authority's (SORTA) Clean Air Fare Program**: Since 1995, SORTA, which operates Metro Cincinnati, received approximately $1 million per year in CMAQ funds to subsidize lower smog-season fares. For 2001, SORTA offered a reduced fare of 50 cents per ride on weekdays only at a program cost of $1.283 million. During this period, over 217,894 additional rides were provided on Metro Cincinnati, and SORTA reported that 2,599 cars and 13,658 vehicle miles traveled were reduced. For 2002, the SORTA offered a flat fare of 50 cents per ride for 64 weekdays from June through August at a program cost of $1.32 million. Program results for 2002 are not available. For 2003, CMAQ funds were not available for the Clean Air Fare Program, but the SORTA Board did authorize the use of $810,000 in CMAQ funds for education, advertising and promotion activities. As part of the 2003 education campaign, 800,000 cards, which included a free ride coupon, were sent to homes located within three blocks of nine city bus routes and seven miles of suburban park and ride locations. A total of 42,559 coupons (passenger trips) were redeemed between July and September, resulting in a five percent return rate. When comparing the results of the 2003 education campaign to the 2002 reduced fare campaign, the ridership level for 2003 dropped by one percent in June and by five percent each for July and August. SORTA concluded that pricing the fare at 50 cents all summer encourages more riders than the free rides one day per week. The Clean Air Fare Program ceased after 2003 due to the lack of funding.

OZONE EXCEEDANCES

The Air District's long-standing Spare the Air campaign is an episodic measure aimed at discouraging polluting behavior on days when weather conditions are conducive to high ozone levels. Because most air pollution is preventable, the Spare the Air campaign focuses on educating and encouraging the public to engage in pollution reducing activities such as driving less, taking transit, trip-linking and so forth. In this vein, a concerted effort by Bay Area businesses, government agencies, and members of the public to reduce polluting activities on Spare the Air days may in turn help to reduce the level and number of ozone exceedances or avert them altogether.

For the 2006 ozone season, the Air District issued eleven Spare the Air advisories. Free transit rides were offered on the first six Spare the Air weekdays -- June 22, 23, and 26 and July 17, 20, and 21, 2006. Key results from this year's ozone season are as follows (see Table 6):

- The 2006 ozone season experienced two heat waves in June and July that contributed to exceedances of the national 8-hour ozone standard on 12 days. Monitoring station sites that recorded a total of four or more exceedances of the national 8-hour standard for the season include Concord, Livermore, Los Gatos and San Martin.

- Of the six Spare the Air weekdays with free transit, no exceedance of the national 8-hour standard was recorded on June 26 and July 20. On the four other Spare the Air weekdays, the 8-hour standard was exceeded at the following monitoring station sites: Bethel Island, Concord, Fairfield, Livermore, Pittsburg, Los Gatos, and San Martin.

Table 6: Exceedances of National 8-Hour Ozone for 2006 (PRELIMINARY DATA FOR ENTIRE 2006 OZONE SEASON)
Exceedances are based on preliminary ozone measurements. Final determination may change after all air quality assurance checks are completed. The national 8-hour ozone standard is 0.08 (80 parts per billion (ppb)). 8-hour average concentrations greater than or equal to 85 ppb are exceedances.

Station Location	Maximum 8-Hour Conc. in ppb	Total National 8-Hour Excess	6/21	* 6/22	* 6/23	7/8	7/16	* 7/17	7/18	* 7/21	7/22	7/23	7/24	8/9
Northern Counties														
Napa	72	0												
San Rafael	58	0												
Santa Rosa	58	0												
Vallejo	69	0												
Coast & Central Bay														
San Francisco-Arkansas	45	0												
San Pablo	53	0												
Eastern District														
Bethel Island	90	1								90				
Concord	92	5		88			85	92		91		86		
Fairfield	87	1		87										
Livermore	101	5			101		89	93	87	99				
Pittsburg	93	1								93				
South Central Bay														
Fremont	74	0												
Hayward	71	0												
Redwood City	61	0												
San Leandro	60	0												
Santa Clara Valley														
Gilroy	101	2	94								101			
Los Gatos	87	4						85			87	86	85	
San Jose-Central	87	1												87
San Martin	105	5	91			86				94	105			88
Sunnyvale	78	0												
Station Totals		**25**	**2**	**2**	**1**	**1**	**2**	**3**	**1**	**5**	**3**	**2**	**1**	**2**
Total Days		**12**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**

***Spare the Air/Free Transit Day**

Source: BAAQMD, 2006

While hot temperatures, light winds, and strong temperatures inversions are the key reasons why the ozone levels were high (resulting in exceedances), the air quality conditions could have been much worse without the effort of the 2006 Campaign to encourage different travel behaviors and offer free transit as a mode option.

Although the Bay Area had 12 national 8-hour standard exceedances during this year's summertime ozone season, this does not necessarily mean the region will be unable to comply with the national 8-hour standard. Compliance is determined at each monitoring station using an average of the 4th highest ozone reading for three years. A violation at any monitoring station results in a nonattainment designation for the entire region because ozone is a regional pollutant. As shown in Table 7, the region met the national 8-hour standard for 2004 and 2005. Based on the preliminary ozone readings for 2006, the region has demonstrated attainment of the national 8-hour standard for 2006 because the fourth highest reading for 2006 does not exceed the threshold value for non-attainment.

Table 7: Attainment Status of the 8-Hour National Standard

Station	**Threshold Value for Non-Attainment**	**2004 4th High**	**2005 4th High**	**2006 3rd & 4th Highest Readings** (preliminary data for entire 2006 season)
Livermore	**103**	77	75	93, 89
San Martin	**113**	73	69	91, 88
Concord	**116**	74	65	88, 86
Bethel Island	**117**	70	68	81, 81
Los Gatos	**119**	74	62	85, 85

Source: BAAQMD, 2006

The burning question becomes "What is the likelihood of exceeding the national 8-hour standard in 2007?" To investigate the likelihood of continuing to meet the 8-hour standard in 2007, we compute the minimum 4th highest 8-hour value a site would have to register to violate the standard. For example, Livermore registered 75 parts per billion (ppb) in 2004 and 89 ppb in 2006, so to just violate the standard, it would take X ppb in 2007 where (75+89+X)/3=85, or X=91. So Livermore's 4th highest ozone reading would have to be 91 ppb or more for 2007 to have a violation of the 8-hour standard. Table 8 shows the minimum 4th highest 8-hour value necessary to violate the standard for 2007 at select monitoring sites.

Table 8: 2007 4th Highest 8-Hour Averages (ppb) To Violate the 8-Hour Standard

Station	**2005 4th High**	**Assumed 2006 4th High***	**2007 Minimum Violation Concentration Threshold**
Livermore	75	89	**91**
San Martin	69	88	**98**
Concord	65	86	**104**
Bethel Island	68	81	**106**
Los Gatos	62	85	**108**

*Assumed 4th highest reading for 2006 is based on preliminary data shown in Table 7.

When compared to other major California air basins, the number of 8-hour exceedances and peak 8-hour concentrations for the Bay Area are significantly lower than those recorded for the San Joaquin and South Coast (Los Angeles) air basins (see Table 9).

Table 9: 2006 Ozone Exceedances Major California Air Basins (preliminary data through October 31, 2006)

Air Basin	National 8-Hour Excess	Peak Max 8-Hour Conc. in ppb
Bay Area	**12**	**105**
San Diego	9	100
Ventura	17	105
Sacramento	41	115
San Joaquin	85	121
South Coast	86	142

Source: California Air Resources Board, 2006

SUPPLEMENTAL INFORMATION - BRIDGE TRAFFIC VOLUMES

Bridge traffic volumes are provided in Table 10-A and10-B to determine if there are any impacts of the free transit offer on bridge traffic. Note that changes in traffic volume on Bay Area toll bridges on any given day may be influenced by a number of factors, including sporting events and social attractions that may draw auto travel across the bridges. Because of the slight fluctuations in bridge volumes (ranging from zero percent to four percent increase/decrease), no conclusions are being drawn about the direct or indirect correlation between free transit and bridge traffic. The key trends are highlighted below:

- Traffic volumes on the Bay Area toll bridges declined on three of the six Spare the Air/Free Transit days compared to the same day from the previous week – 3,000 fewer cars crossed the bridges on June 22; 16,700 fewer cars on June 26; and close to 400 fewer cars on July 21, 2006.

- Traffic to San Francisco across the Bay Bridge and Golden Gate Bridge registered the largest declines, with close to 8,500 and 1,500 fewer cars, respectively, on June 26 compared to the same day from the previous week.

Table 10-A: Bridge Traffic Volumes (June 22, 23, & 26)

	Thurs June 22	Baseline	Numeric Change	Percent Change	Fri June 23	Baseline	Numeric Change	Percent Change	Mon June 26	Baseline	Numeric Change	Percent Change
SFOBB	132,596	133,165	-569	-0.4%	134,342	129,324	5,018	3.9%	124,543	132,991	-8,448	-6.4%
Antioch	8,043	8,039	4	0.0%	9,321	9,901	-580	-5.9%	7,871	7,687	184	2.4%
Richmond	38,878	38,432	446	1.2%	39,516	38,653	863	2.2%	36,136	36,675	-539	-1.5%
San Mateo	51,487	51,938	-451	-0.9%	52,778	52,397	381	0.7%	49,290	52,646	-3,356	-6.4%
Dumbarton	35,922	36,348	-426	-1.2%	34,683	35,652	-969	-2.7%	35,273	34,853	420	1.2%
Carquinez	65,725	66,553	-828	-1.2%	74,504	73,405	1,099	1.5%	60,055	62,240	-2,185	-3.5%
Benicia	55,457	56,211	-754	-1.3%	59,136	59,354	-218	-0.4%	51,993	53,260	-1,267	-2.4%
Golden Gate	58,335	58,796	-461	-0.8%	58,830	58,323	507	0.9%	54,506	56,051	-1,545	-2.8%
Total	**446,443**	**449,482**	**-3,039**	**-0.7%**	**463,110**	**457,009**	**6,101**	**1.3%**	**419,667**	**436,403**	**-16,736**	**-3.8%**

Table 10-B: Bridge Traffic Volumes (July 17, 20, 21 and 6-Day Total)

	Mon July 17	Baseline	Numeric Change	Percent Change	Thurs July 20	Baseline	Numeric Change	Percent Change	Fri July 21	Baseline	Numeric Change	Percent Change	Total 6 STA Days	Total 6 Baselines	Numeric Change	Percent Change
SFOBB	129,374	126,369	3,005	2.4%	134,039	134,109	-70	-0.1%	133,580	135,709	-2,129	-1.6%	**788,474**	**791,667**	**-3,193**	**-0.4%**
Antioch	7,470	7,525	-55	-0.7%	7,966	8,079	-113	-1.4%	9,715	9,833	-118	-1.2%	**50,386**	**51,064**	**-678**	**-1.3%**
Richmond	36,138	36,553	-415	-1.1%	38,541	38,687	-146	-0.4%	38,875	38,937	-62	-0.2%	**228,084**	**227,937**	**147**	**0.1%**
San Mateo	52,162	49,165	2,997	6.1%	52,906	52,323	583	1.1%	52,260	51,646	614	1.2%	**310,883**	**310,115**	**768**	**0.2%**
Dumbarton	34,055	34,063	-8	0.0%	37,236	35,924	1,312	3.7%	35,776	35,618	158	0.4%	**212,945**	**212,458**	**487**	**0.2%**
Carquinez	60,593	60,670	-77	-0.1%	67,548	65,516	2,032	3.1%	73,875	73,476	399	0.5%	**402,300**	**401,860**	**440**	**0.1%**
Benicia	48,901	50,730	-1,829	-3.6%	55,939	54,559	1,380	2.5%	58,665	59,557	-892	-1.5%	**330,091**	**333,671**	**-3,580**	**-1.1%**
Golden Gate	56,779	54,212	2,567	4.7%	60,697	58,952	1,745	3.0%	60,275	58,608	1,667	2.8%	**349,422**	**344,942**	**4,480**	**1.3%**
Total	**425,472**	**419,287**	**6,185**	**1.5%**	**454,872**	**448,149**	**6,723**	**1.5%**	**463,021**	**463,384**	**-363**	**-0.1%**	**2,672,585**	**2,673,714**	**-1,129**	**0.0%**

Baseline = Same Day Last Week (June 15, 16, 18 & July 10, 13, 14, 2006)
SFOBB = San Francisco-Oakland Bay Bridge

Source: BATA and GGBHTD, 2006

PROJECT IMPLEMENTATION – TRANSIT OPERATIONS

- Operator's lost farebox revenue was completely reimbursed by MTC and the Air District.

- Transit operators stood ready to implement the free transit promotion, and the implementation was smooth for all operators except those who experienced the crowding and security issues noted below.

- Transit operators were able to expose their transit services to a new customer base, attracting new riders to use the system on a regular basis.

- Transit operators' execution of the free transit offer allowed them to identify the true capacity of their systems. This information will be useful in planning for emergency response to disasters such as an earthquake.

- The Golden Gate Transit and Alameda/Oakland Ferry operators experienced some unique challenges, testing their ability to control crowds, ensure transit security, maintain on-time performance levels, and respond to frustrated regular ferry riders. On-time performance was compromised due to the record-high number of ferry riders, resulting in serious service delays and the need to bring into service additional ferryboats on the last two Spare the Air weekdays.

- Transit security and passenger safety were key priorities for all the transit operators given the increased number of passengers on any single bus, train, or ferry boat. These challenges were particularly acute for BART during the three July Spare the Air days. Specifically, for July 21, BART police reported that calls for service were double what they would normally expect. Most of these calls occurred during the afternoon and evening hours. BART customer service also reported over a dozen customer complaints concerning the July Spare the Air days, with most complaints focused on security concerns.

- Caltrain also reported that many older adults took refuge on the trains to escape from the heat, and the high number of first-time and/or non-regular riders unfamiliar with the Caltrain system resulted in crowding, service delays and an overall unpleasant transit atmosphere and experience for its riders.

CUSTOMER COMPLAINTS

- Some regular ferry riders complained about the overcrowding and service delays on the ferry boats due to the increased number of new riders during the mid-day and evening peak periods who took advantage of the free ride and viewed it as an e-ticket theme park ride. Some regular passengers felt that ferry rides should not be offered free all-day, or said they would rather drive on Spare the Air days than deal with the overcrowding.

- Some regular BART riders expressed concerns about security on BART, particularly those who rode on cars where groups of unruly teenagers had fights with each other or intimidated and harassed other BART riders.

- A handful of monthly pass holders using Caltrain, ACE, AC Transit, and VINE complained that they would not be reimbursed for the unused day of their monthly pass because they too felt that they should get the ride for free. In response, VINE gave out "oops" passes to their few unhappy monthly pass holders, and the Air District gave "thank you" coupons to transit operators to distribute to their monthly passholders. These includes a two-for-one admission coupon to Disney on Ice; a two-for-one admission coupon to the Ringling Bros and Barnum & Bailey Circus; and a voucher for 50 percent off a new subscription to the San Francisco Chronicle.

- Some Solano, Napa, and West Contra Costa transit riders complained that Vallejo Transit/BayLink Ferry did not participate in the 2006 campaign.

- A few transit riders complained that their bus drivers and train operators were not customer-friendly. Conversely, bus drivers and train operators complained that passengers were bombarding them with too many questions.

CUSTOMER POSITIVE FEEDBACK

- Some riders reported that they felt compelled to get out of their cars because of the Spare the Air messaging.

- Some riders felt that the Spare the Air/free transit offer saved riders money and saved the environment.

- Some riders felt that it was very good to get people to drive less and ride more even though it is not free for monthly pass holders and the buses, trains, and ferries were standing room only.

- Some riders reported that the money saved from the transit fare was redirected to spontaneous shopping and dining activities, which gave the regional economy a nice boost (see San Francisco Chronicle editorial published July 21, 2006).

IDEAS FOR NEXT YEAR'S PROGRAM

In defining the parameters for next year's Spare the Air/Free Transit Campaign, MTC and the Air District will consider the following ideas put forth by transit operators and some members of the public:

- All transit operators except those noted below suggested the continuation of the free, all-day transit offer. Specifically, VTA and other bus operators felt strongly that the free, all-day transit offer was very effective and was by far easier to implement than last year's morning commute offer.

- Golden Gate Transit suggested a "2 for 1" offer wherein passengers would buy one ferry ticket and board for free on the Spare the Air day, but save the purchased ticket for use on another day.

- BART suggested going back to just the free morning commute offer as was done in 2004 and 2005. For BART, the free morning commute offer simply did not produce the safety and security issues that resulted from the free all-day offer.

- Caltrain suggested going back to just the free morning commute offer, but would be amendable to a morning/evening commute offer. Caltrain felt that the all-day offer was not reflective of a typical commute on Caltrain, due in large part to disruptive first-time or non-regular riders, which, in effect, may dissuade riders (new and regular) from taking transit altogether. For Caltrain, commute hours offer the optimal transit experience because the problem crowds are not likely to be out and about. A positive transit experience may compel riders to continue to take transit in the future.

- Other suggestions included offering only free commutes only in the mornings on ferries, Caltrain and BART but free travel all day on all buses.

- A final suggestion was to solicit funding assistance from private sponsors.

IV. CONCLUSIONS

The 2006 Spare the Air/Free Transit campaign successfully achieved its main goals of raising public awareness about the link between travel choice and air quality, and encouraging the public to drive less and take transit more. The most direct impacts of encouraging the public to take transit on Spare the Air days are the substantial increases in transit ridership and the associated emission reductions. Equally impressive, however, are the indirect impacts of the campaign. The 2006 Campaign established new benchmarks for both awareness and positive attitudes about air quality improvement efforts and what actions individuals can take to help keep the air clean and healthy. Increased awareness about Spare the Air spurs increases in the proportion of the population that engages in pollution reduction through other means such as foregoing trips, trip linking, and carpooling. Other indirect impacts not measured by this program evaluation include the positive public health benefits, particularly for people with respiratory conditions, and the economic impacts gained by the spontaneous shopping and dining-out activities as supported by anecdotal evidence.

DIRECT IMPACTS

Increased Transit Ridership: The 2006 Campaign encouraged people to use transit on Spare the Air days for not only work trips but also for all other work-related, medical, recreation, and other trips that occur throughout the day. Overall, the participating Bay Area transit systems carried an additional 1.3 million riders over the six Spare the Air/Free Transit weekdays, which is up 15 percent from baseline conditions. The onboard passenger surveys found that nearly 10 percent of the respondents made a conscious decision to change their travel behavior by taking transit rather than driving their car because it was a Spare the Air day.

Reduced Emissions: An estimated 2.221 tons of nitrogen oxides (NOx), 2.179 tons of reactive organic gases (ROG), and 0.852 tons of particulate matter (PM-10) *per Spare the Air day* were reduced by persuading an estimated 465,444 drivers to reduce an estimated 1.14 trips each. Collectively, drivers reduced an estimated 528,279 vehicle trips and more than 3.5 million miles of travel per Spare the Air day. Another 0.115 tons of ROG were removed *per Spare the Air day* from decreased or

avoided use of consumer products. The estimated totals for emissions reduced on the six Spare the Air days are 13.33 tons of NOx, 13.07 tons of ROG, and 5.11 tons of PM-10 from trip reduction and an additional 0.69 tons of ROG were removed from decreased or avoided use of consumer products.

INDIRECT IMPACTS

Increased Trip Reductions: A greater number of Bay Area residents were compelled to change their driving behavior on Spare the Air days in the interest of protecting air quality. Ten percent of Bay Area drivers reduced at least one trip in response to the 2006 Campaign compared to just three percent prior to when the free transit element was introduced to the campaign (2003). Trip linking and eliminating a trip altogether were the most common methods of reducing one's driving. In total, for the first six Spare the Air weekdays, the 2006 Campaign eliminated over three million vehicle trips per Spare the Air day, which translates to over 21 million vehicle miles reduced in total by the campaign.

High Exposure to Spare the Air Messaging: The 2006 Campaign received unprecedented publicity via the Internet and broadcast, and print media. Seventy-six percent of survey respondents recalled being exposed to news stories or public service announcements related to air quality and/or Spare the Air. Prior to the Spare the Air/Free Transit Campaign (2003), the recalled exposure was only 54 percent.

Economic & Public Health Benefits: While this program evaluation does not assess the economic and public health benefits from the 2006 Campaign, anecdotal evidence from public comments and newspaper opinions and editorials (e.g., San Francisco Chronicle editorial published on July 21, 2006) suggests that some Bay Area residents who took advantage of the free transit rides did engage in spontaneous shopping and dining-out activities, and the emission reductions may have some direct positive public health impacts for children, the elderly, and people with respiratory issues. Furthermore, children, students and your adults took transit, some for the first time, for various trip purposes, resulting in exposure of a new population to transit.