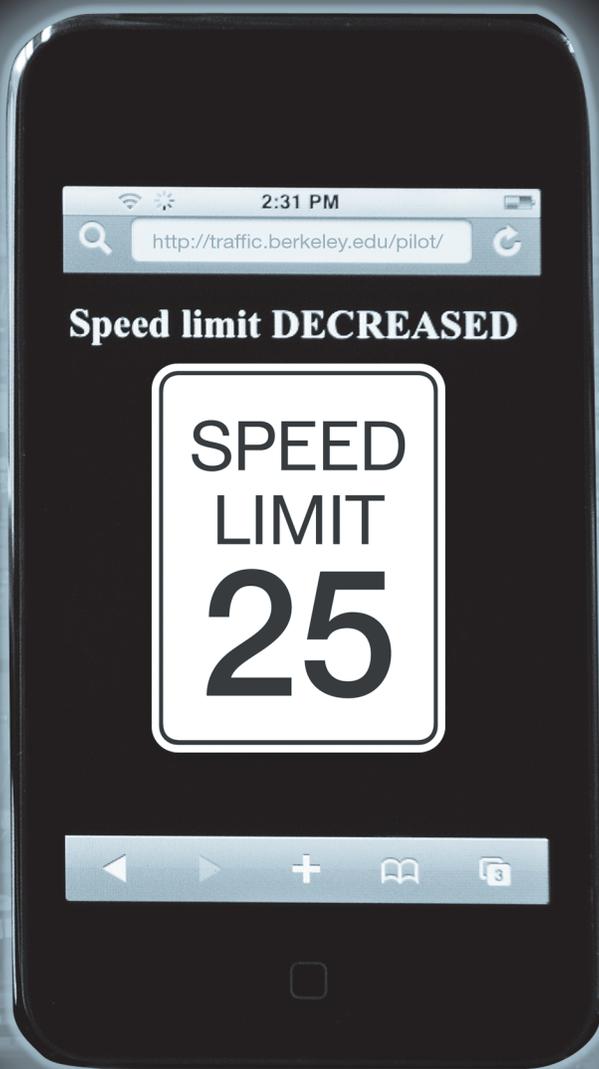


CALIFORNIA TRANSPORTATION

# Journal

2009 | Issue 3



THE NETWORKED TRAVELER



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*is Making History*  *... 20 Quicker*

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# Message from the Caltrans Director



Welcome to the third issue of the *2009 California Transportation Journal*. I think you will find an interesting mix of stories in this edition.

Mehdi Morshed, Executive Director of the California High-Speed Rail Authority, writes about the electric-powered train that someday may speed Californians — at up to 220 mph — between San Francisco and Sacramento at the northern end of California, to Los Angeles and San Diego in the south. This project represents the California of tomorrow.

is also making history today with its \$5.5 billion reconstruction project Francisco-Oakland Bay Bridge. Caltrans Public Information Officer s how the bridge has drawn significant interest from the global

al Samadian, a Caltrans Senior Transportation Engineer, eered by Caltrans and the University of California, at rehabilitation projects more efficient.

ew floral designs on California highways. An innovative p allows for-profit firms to help the State brighten its aining and preserving the roadsides of California's vast . no cost to the State.

.mind both those within, and outside of, Caltrans that safety is priorities. I thank Governor Schwarzenegger for signing the "move ion, which requires vehicles to change to the adjacent lane, if safe, ans flashes its amber lights.

s issue of the *California Transportation Journal* was being prepared for ication, two Caltrans employees — Maria Garza and Jose Lopez — suffered tical injuries on Interstate 15 in San Diego while removing litter. They were struck by a distracted motorist. Both have a long road to recovery and we wish them our best. This incident underscores the urgent importance I give to safety, along with the appropriateness, and timeliness, of the "move over" legislation.

That's all the space I have in this issue. I hope you enjoy what we have to offer.

Sincerely,

*Randell H. Iwasaki*  
Randell H. Iwasaki, Director



# Innovating Without A

***What is an innovation? A discovery?***

***An opportunity to make things  
better for future generations?***

Many discoveries are not considered an “innovation” because they never reach the real world. For Caltrans’ Division of Research and Innovation, research has to become a workable reality to achieve true innovation.

Caltrans recognizes innovation as one of its four values, in addition to integrity, commitment and teamwork. Caltrans empowers employees to seek creative solutions and take intelligent risks.

But innovation — whether it be an idea, method, or device — is incomplete unless it is integrated into a working system. Here is a sample of some of Caltrans’ successful innovations that are changing the lives of our customers.

All smart phone photos courtesy of UC Berkeley Photography



# Transportation

## Crystal Ball

By Larry Orcutt, Caltrans Research and Innovation Chief

How many times have you been stopped in traffic, wishing you had anticipated the traffic snarls that you could have avoided with an alternate route?

Caltrans and its partners do not have a mystical crystal ball, but transportation officials are working on something just as handy.

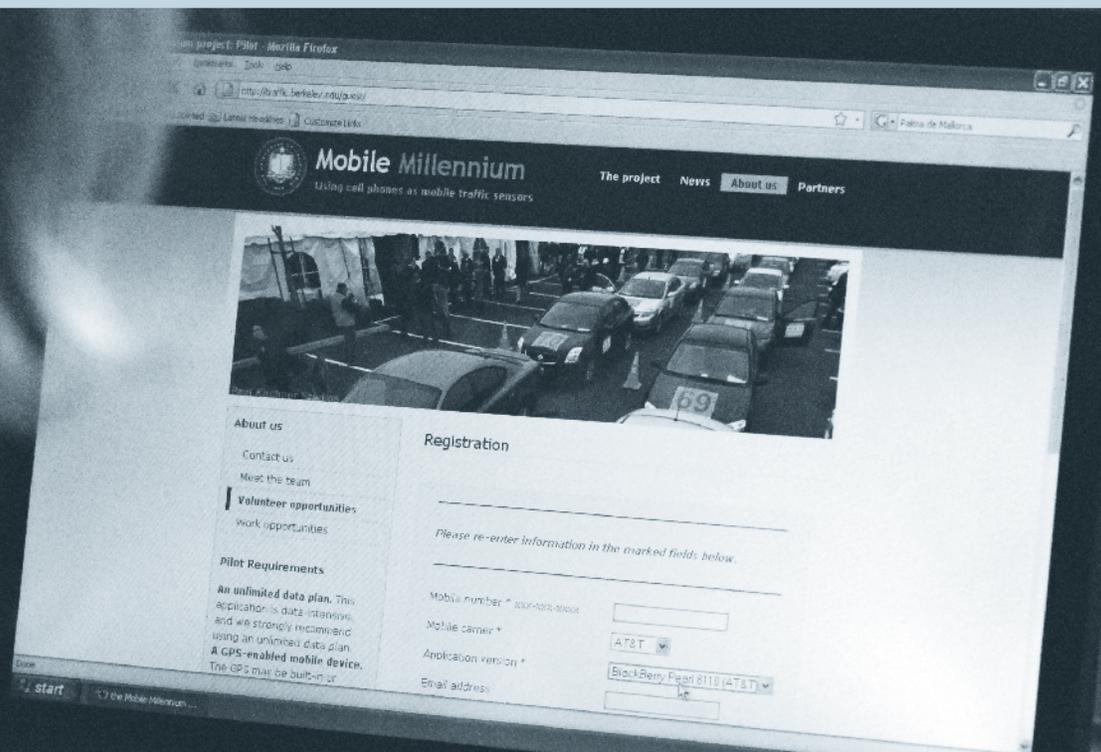
The Safe and Efficient Travel through Innovation and Partnerships for the 21st Century (SafeTrip 21) Initiative is intended to expand and accelerate the U.S. Department of Transportation's (US DOT) Vehicle Infrastructure Integration (VII) Program. Sponsored by the US DOT Research and Innovative Technology Administration (RITA), the

program will build upon sophisticated information, navigation, and communications technologies research to advance national transportation goals in safety and mobility.

### SafeTrip-21 Initiative

The SafeTrip 21 Initiative was designed to reduce motor vehicle crashes, alleviate traffic congestion, enhance transit use and ride sharing, promote motor freight efficiency and safety, allow convenient electronic payment options, moderate environmental impacts, and reduce unnecessary motor fuel consumption in both urban and rural settings.

*continued on page 4*



“We’re integrating existing technologies to show that we can measurably improve safety and transportation system efficiency or mobility,” said RITA Administrator Paul Brubaker. “SafeTrip-21 is designed to demonstrate that through better use of information, navigation, communications, technologies, and protocols, we can make a measurable impact.”

RITA selected Caltrans and its partners to perform the first two projects, “Mobile Millennium” and “Networked Traveler.”

### Mobile Millennium

Caltrans is leading Mobile Millennium in partnership with Nokia, Navteq, the California Center for Innovative Transportation at the University of California, Berkeley, and the US DOT. The funding for Mobile Millennium is \$6 million, including federal, state, and private sector shares. This project takes advantage of recent progress in “smart” cell phone technology, particularly the emerging trend of including Global Positioning System (GPS) receivers that can determine precise speeds and locations.

Within the next year, many of Nokia’s cell phones will have GPS capabilities. Other cell

phone makers, such as Apple, Samsung, LG and RIM (Blackberry), are beginning to produce GPS-equipped phones as well. Drivers with GPS-equipped cell phones can collect their vehicle speed at a given location, providing them with real-time traffic conditions and travel times. Mobile Millennium uses the existing cell phone network and private sector partners. Nokia and Navteq perform the necessary computer processing. This technology uses existing Caltrans infrastructure, which saves Caltrans the capital costs of installing new infrastructure, as well as recurring operation and maintenance costs.

This project is based on a successful proof-of-concept demonstration, called Mobile Century, which took place on February 8, 2008. In the Mobile Century project, 100 cars with GPS-equipped cell phones were driven along a 10-mile loop of Interstate 880, near Fremont, for 10 hours. The traffic data generated by these cars compared quite favorably to the data collected from existing Caltrans vehicle sensors along this loop, showing that the concept was worth pursuing further.





The Mobile Millennium pilot project will use up to 10,000 volunteer motorists, driving their normal routes and patterns. Even though this is a small number compared to the total number of cars in the Bay Area, the Mobile Century experiment proved that as few as 2 percent of equipped cars on the roadway can provide excellent traffic data quality. Since November 10, 2008, volunteers have been signing up to participate in Mobile Millennium. If cell phone users meet the criteria for inclusion in the project, they can download the enabling client software into their cell phones from the following Web site: <http://traffic.berkeley.edu>. In exchange for providing traffic data through their cell phones, the volunteer drivers are given traveler information on their cell phones in the form of a traffic speed-map that shows red, yellow, and green indications of traffic speeds along their route.

The project will collect data from the Bay Area, as well as the Interstate 80 and US-50 corridors between San Francisco and Lake Tahoe. This data

will inform recreational travelers, primarily skiers, of real-time traffic conditions as they drive to and from the Bay Area.

Program organizers are exerting considerable effort to protect the privacy of volunteer drivers. The cell phones do not begin to transmit data until drivers have traveled a minimum distance from their starting point, and data is not sent continuously, but at random intervals. There are several other features designed to protect privacy. Independent research entity, Rutgers University, is evaluating the design to ensure that it satisfies these requirements.

To maintain safety, researchers are investigating hands-free operations that use speech recognition technology to receive driver commands. They are also looking at text-to-speech capabilities that convert information to a spoken format to enable motorists to keep their attention on the task of driving.

With this technology, Caltrans can collect traffic data on arterial routes, such as El Camino Real

(State Route 82) and San Pablo Avenue (SR-123), which do not have traffic sensors. Mobile Millennium will allow Caltrans to provide drivers with efficient real-time traveler information (speeds and travel times) on these arterial routes. Virtual trip lines (VTL) are placed on certain routes. The entire country has VTLs installed in anticipation of a national deployment of this technology.

Caltrans management expects that the pilot program will lead to a product and large-scale deployment in other regions, such as Los Angeles, San Diego and Sacramento. The private sector has the ability to rapidly deploy the product once approved.

### **Networked Traveler**

The second project, called Networked Traveler, is an outgrowth of the existing VII California test bed, which is a wireless network already operating in Palo Alto. The test bed broadcasts safety and mobility information over Wi-Fi and short-range communications. It takes advantage of the ongoing revolution in wireless and personal computing to improve safety and increase mobility for travelers. This field operational test will develop and showcase applications based on existing consumer products,

such as smart cell phones and personal navigation devices, as a means of delivering personalized traveler information to drivers and transit riders. Caltrans is leading the Networked Traveler project in partnership with US DOT, Navteq, Nissan, Santa Clara Valley Transit Authority and the Metropolitan Transportation Commission.

The Networked Traveler serves as the catalyst to America's transportation future. It is our version of the predictive crystal ball. It makes traveling safer and more efficient by giving motorists access to information before and during a trip. It provides a link between the devices of today, and those of the future, where safety and information systems will be integrated into auto assembly lines.

The Networked Traveler employs cell phones to alert drivers to stalled traffic ahead. This application seeks to reduce the type of crashes in which distracted or inattentive drivers do not react in time to avoid a line of cars in front of them. A large percentage of car crashes on the freeway fit this category and result in severe injuries and fatalities. The safety alert system is intended to give drivers enough time to stop and avoid these crashes.



The Networked Traveler improves mobility by giving transit riders pre-trip planning information, as well as en route, real-time travel information. The project enables users to receive information such as route connection, transfer, next bus arrival time, and real-time arrival estimates. This information provides significant benefits to transit riders, making their trips more reliable and efficient.

During 2009, the Networked Traveler will use the San Francisco Bay Area roadway infrastructure for a field operational test. It employs communications between infrastructure and the traveler to benefit motorists and transit riders. Both Mobile Millennium and Networked Traveler were demonstrated in November 2008 at the Intelligent Transportation Systems (ITS) World Congress in New York City. These demonstrations provided attendees with a real-world preview of the testing planned through 2009. The Mobile Century project earned a Best of ITS award at the 2008 ITS America Annual Meeting.

As these two projects are deployed, they will change how today's transportation systems are operated by providing travelers real-time information that will improve their quality of life. How many times have you been stopped in traffic, wishing you had been notified to take an alternate route? Having real-time information will enhance our ability to manage transportation systems. Transit and highway user information will improve our ability to reduce travel demand by getting reliable and accurate data to users so they can avoid the peak demands on the transportation systems. The Safe Trip-21 projects will truly showcase what ITS can do with today's technologies to improve mobility across the nation.

Caltrans does not have a crystal ball, but it has committed to work with a national team of transportation stakeholders to create and use a variety of public services that are just as amazing.

For more information, e-mail Greg Larson at [greg\\_larson@dot.ca.gov](mailto:greg_larson@dot.ca.gov). 



*From left to right: California Partners for Advanced Transit and Highways Researchers Kun Zhou and Liping Zhang are developing software for the Network Travelor demonstration at the ITS World Congress in New York City in November 2008.*



*From left to right: US Department of Transportation Research and Innovative Technology Administrator Paul Brubaker, Caltrans Director Randy Iwasaki and Savari Systems, Inc., President Ravi Puuvala stand on the test bus at the SafeTrip-21 Kick-off Media Event at the San Francisco-Oakland Bay Bridge Toll Plaza in June 2008.*



## **High-Speed Train Authority Prepares to Lay Down Tracks**

*By Mehdi Morshed, Executive Director  
California High-Speed Rail Authority*

In November 2008, California voters gave the go-ahead to the first and only contemporary high-speed train operating on dedicated right of way in the United States. This is a 21st century alternative for a state transportation system designed for the 20th century. This statewide venture is expected to transform the way people travel between cities in California, offering a choice of driving, flying or using high-speed trains.

Voter approval of Proposition 1A on the ballot authorized \$9 billion in bond funding for the 800-mile train network capable of speeds up to 220 miles per hour. It also provided \$950 million to finance capital improvements to commuter and intercity rail as well as local transit lines that will connect existing infrastructure to the high-speed train system.

While the California High-Speed Rail Authority has spent more than a decade on research, study, planning, environmental and economic review, and public and legislative debate, in many ways the work has just begun. The next decade will be devoted to actually building the system.

Over the next three years, the Authority will focus on environmental and engineering work on six segments of the system: Los Angeles to Anaheim,

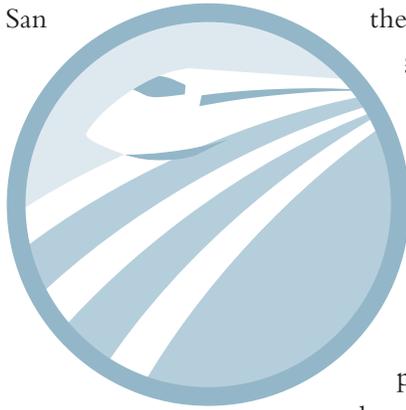
# MAKING



Los Angeles to Palmdale, Palmdale to Fresno, Fresno to Merced, Central Valley to San Jose, and San Jose to San Francisco.

Construction is expected to start in 2012 on alignment preparation, laying tracks and building civil structures. The Los Angeles/Anaheim to San Francisco backbone of the system through the Central Valley is expected to be completed between 2018 and 2020.

Caltrans will play a significant role in developing the system, including securing rights of way, materials testing, construction inspection and determining where the train system interfaces with state transportation facilities.



In addition to coordination with Caltrans, the Authority will work with local governments and transportation planning agencies from San Diego to Sacramento and the San Francisco Bay Area to integrate and coordinate the statewide high-speed train with local and regional transportation systems, land use planning principles and economic development efforts.

The system is expected to provide a new transportation option available to 90 percent of California residents. Riders will be able to travel from Los Angeles to San Francisco in about two and a half hours, from Anaheim to Sacramento

*continued on page 10*

# TRACKS



*Artist renderings provided by NC3D©*

in two and a half hours and from Fresno to San Jose in one hour.

A high-speed train system between Los Angeles/Anaheim and San Francisco with extensions to Sacramento and San Diego will eventually carry more than 90 million passengers, and generate \$3.6 billion in gross revenues, with fare levels around half the cost of airfares.

The system will be built along, or adjacent to, existing rail transportation facilities instead of creating new transportation corridors. This should reduce unplanned growth and sprawl problems in both rural and urban areas. Stations will be spaced approximately 50 miles (80 km) apart in rural areas and 15 miles (24 km) apart in metropolitan

areas to realize the most efficient benefit from high-speed travel.

In virtually every major city, a high-speed train station will be developed in conjunction with existing rail transportation hubs to produce the most efficient linkages to local and regional transit systems. Efficient integration of the high-speed train network with local transportation systems is paramount and key to the success of both.

According to the Authority's updated business plan released in November 2008, high-speed trains will alleviate the need to spend nearly \$100 billion to build about 3,000 miles of new freeway, five airport runways and 90 departure gates during the next two



decades. A statewide high-speed train system will meet that same need for about half the cost.

It will use only one-third the energy of airplanes and one-fifth the energy of passenger automobiles. It will help free California from dependence on foreign oil by 12.7 million barrels per year, and reduce the greenhouse gases that cause global warming by 12 billion pounds per year.

Design, preparation and construction of the high-speed train system are expected to create thousands of jobs, stimulating California's public and private economies. Nearly 160,000 construction-related jobs will be generated to plan, design and build the system. About 450,000 permanent jobs are expected to result from the economic growth the train system will bring to California.

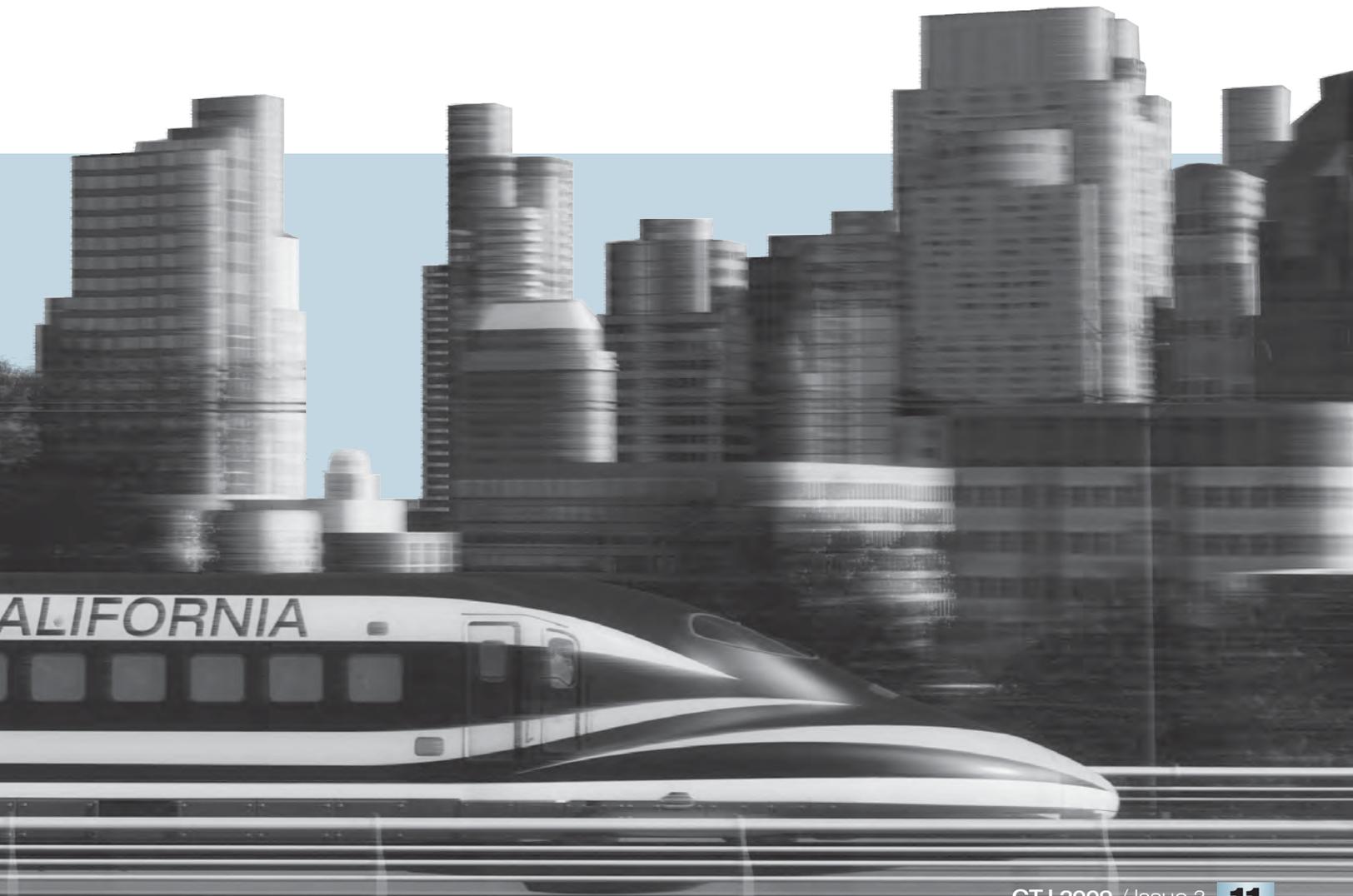
The public will realize long-term benefits as well. There will be an improved movement of people,

goods and services throughout the state. Train travel times will decrease. There will also be reduced delays to air and auto travelers as freeways and airports are relieved of congestion. Air quality will also improve, and that will help reduce related health care costs.

The backbone link from Los Angeles/Anaheim to San Francisco will cost \$33 billion in 2008 dollars. Once built, it is not expected to require operating subsidies. Financial experts predict it eventually will generate surplus revenues of about \$1 billion a year.

The legislation that guided Proposition 1A (AB 3034) states that the Authority must find matching funds for the state bonds. As a result, the Authority has developed a three-tier financing strategy for planning, design and construction

*continued on page 12*



phases of the project — a combination of state and local funding, federal funding and “P3” public-private partnerships. In the long term, train users will pay for the operation of the system.

Planners expect to identify \$2 billion to \$3 billion in local financing for the Los Angeles/Anaheim to San Francisco link. Local funding is expected to come from local transit: development, commercial concessions at rail stations and cooperative funding arrangements with local transportation agencies.

The California High-Speed Rail Authority will seek \$12 billion to \$16 billion from federal sources. The High-Speed Rail for America Act, sponsored by U.S. Senators John Kerry (D-MA.) and Arlen Specter (D-PA.), will be a principal target since it would invest more than \$23 billion in high-speed rail across the country. That legislation is cosponsored by California Sen. Dianne Feinstein and is supported by Governor Arnold Schwarzenegger’s national infrastructure coalition, “Building America’s Future.” The measure would create the

Office of High-Speed Passenger Rail to oversee high-speed train development and provide a consistent funding source.

In addition, President George Bush signed the Passenger Rail Investment



and Improvement Act of 2008 to reauthorize Amtrak with \$1.5 billion for five years to finance construction and equipment for 11 high-speed train corridors, including California.

Major private investment sources are likely to include private equity funds, new infrastructure funds, pension funds and corporate operational partners. In spring 2008, the Authority issued a Request for Expressions of Interest to gauge private sector participation interest. It generated 30 responses, including strong interest from major construction firms, system and equipment providers, financial institutions and operators. Five firms were also willing to consider significant capital investment in the system.

We're laying the tracks with Caltrans to improve mobility across California.

For more information, contact the California High-Speed Rail Authority at: (916) 324-1541, [comments@hsr.ca.gov](mailto:comments@hsr.ca.gov) or go to <http://www.cahighspeedrail.ca.gov/> 



*Left: This map outlines the plans for California's high-speed rail routes. Photos: Computer renditions show what the train tracks and stations would look like once completed.*





# California is

*By Bart Ney, Caltrans Public Information Officer*

***Halfway through its reconstruction, the San Francisco-Oakland Bay Bridge — a visual icon in the region — has attracted an entirely new audience and form of recognition: from the global Internet community.***

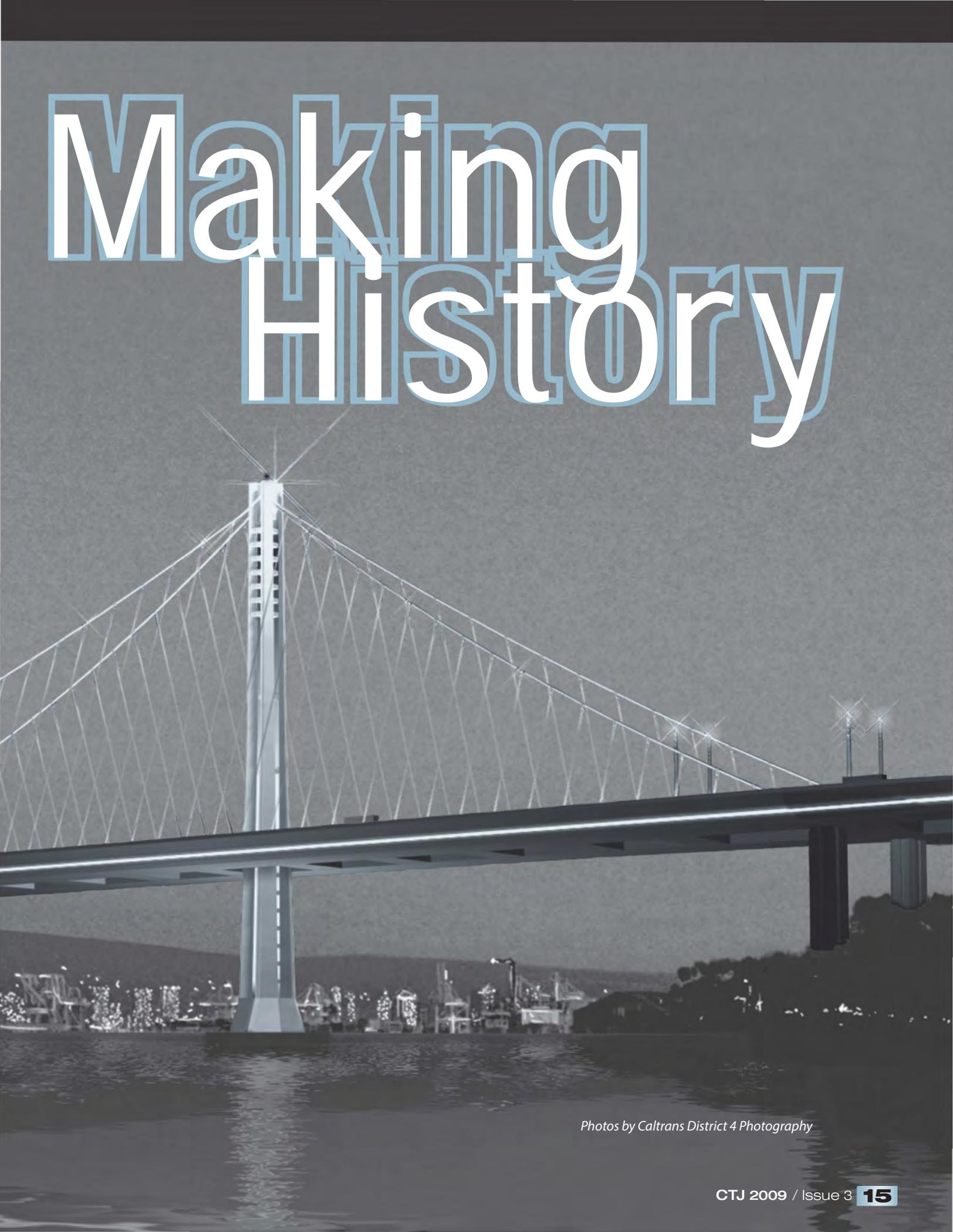
The series of mind boggling construction and engineering feats to retrofit and replace the entire eight mile bridge represents the largest and most challenging public works effort in California history. This monumental undertaking requires a massive mobilization of resources and resolve.

The determination of the vast workforce from construction crews to designers is unprecedented. It can be seen in every element of this endeavor, from herculean feats such as replacing a 6,700 ton slab of roadway ahead of schedule, to the smallest details, such as the art deco touches on the support columns of the west approach.

*continued on page 16*



# Making History



*Photos by Caltrans District 4 Photography*



In addition to innovative architectural and engineering plans, Caltrans had a new outreach plan for this monumental project.

The Department had the Bay Bridge construction rendered on a three-dimensional model for large communications efforts and was looking for a bit more cachet with the electronically savvy online community. The Department negotiated directly with Google to make this happen.

Originally, Google Earth would not show buildings or structures under construction on its Web site. But Caltrans staff took their computer illustration of the bridge and offered to provide a model that showed the completed parts of the new bridge as solid imagery and the parts of the bridge that were under construction as transparent. Department staff promised to update the image as major construction milestones occur. Google management liked the idea and the model, and approved and posted it for public use. The Bay Bridge is now the first construction project in history to be represented on Google Earth.

### *Online Benefits*

Now people from around the world will discover the Bay Bridge reconstruction projects unexpectedly while searching Google Earth for restaurants or other items of interest in the Bay Area. They can virtually fly all around it and view it from any angle. As Caltrans staff update the model, the

world can follow the bridge's construction virtually and in three dimensions.

This accomplishes a lot for Caltrans, the Bay Area Toll Authority and the California Transportation Commission in their collaborative effort to communicate to the public. This additional communications path can be used when there are major messages to get out — like bridge closures. Google Earth's structure information bubble links viewers to the Caltrans Web site, which contains the latest lane closure and construction information.

The Department also plans to use Google Earth as a teaching tool for its educational outreach program. The self-anchored suspension model in Google Earth will help students understand the geometry and the proximity of the structure to other Bay Area locations.

.....  
*Left:* Crews use gigantic leg cranes to construct the San Francisco-Oakland Bay Bridge.



.....  
*Above:* The top deck of the Bay Bridge collapsed in 1989 when the Loma Prieta earthquake shook the Bay Area. Seismic retrofit plans began immediately afterward.

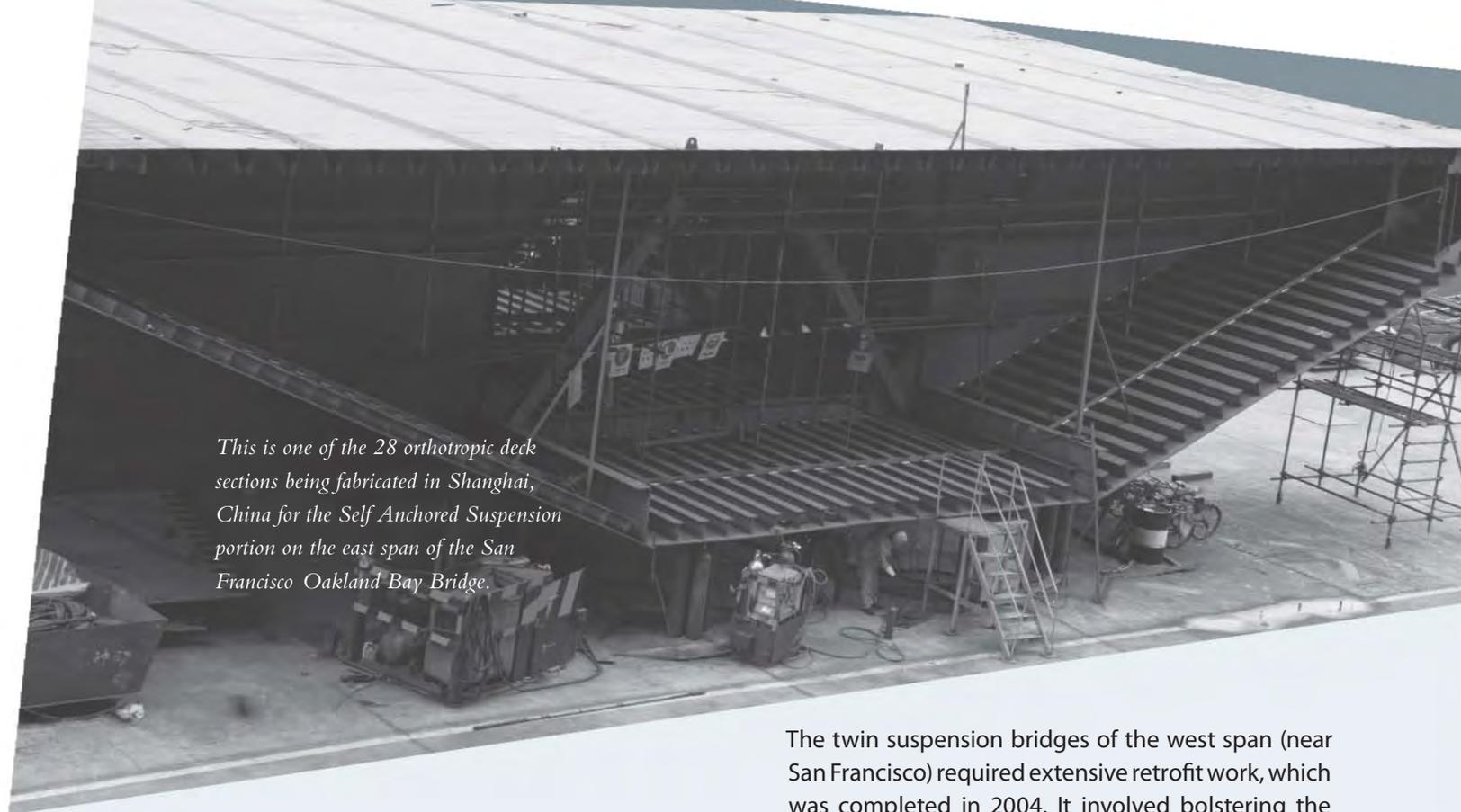
In addition to the Bay Bridge earning the title of the first construction project to be featured on Google Earth, the *BayBridge360.org* Web site has garnered Adobe's "site of the day" award. These accomplishments have increased the Bay Bridge project's cool cachet with folks in the online community.

## Construction

The Bay Bridge retrofit and replacement efforts were jolted into life by the 1989 Loma Prieta earthquake. During the historical 7.1-magnitude event, a 250-ton section of the upper deck collapsed on the east span. The bridge closed temporarily for repairs. Crews quickly reopened the east span within a month, but critical questions lingered: How could the Bay Bridge — an important regional lifeline structure — be strengthened to withstand the next major earthquake? Should the bridge be rebuilt, repaired or both?

*continued on page 18*





*This is one of the 28 orthotropic deck sections being fabricated in Shanghai, China for the Self Anchored Suspension portion on the east span of the San Francisco Oakland Bay Bridge.*

These were important decisions to ensure that the Bay Bridge would survive heavy seismic activity, and provide access for emergency services and rebuilding efforts afterward.

Seismic experts from around the world performed an exhaustive study. They determined that to make each element seismically safe on a bridge of this size, the work must be divided into numerous projects. Each project presented unique issues, and each component needed to contend with one common challenge — the more than 280,000 vehicles that cross the bridge each day.

Keeping traffic flowing on one of the nation's busiest bridges in the midst of this work demands new levels of innovation, from complex traffic shifts and the staging of crews and equipment, to unique approaches to demolition and construction. Caltrans has celebrated several milestones already: Traffic is now flowing smoothly on the permanent east-bound and westbound decks of the west approach in San Francisco. The 1.2-mile-long skyway, with its stunning panoramic bay views, is now complete. And all retrofit work is finished on the west span between San Francisco and Yerba Buena Island.

The twin suspension bridges of the west span (near San Francisco) required extensive retrofit work, which was completed in 2004. It involved bolsterring the span with massive amounts of steel, concrete, bolts and new seismic safety technology.

The west approach is a one-mile stretch of Interstate 80 in San Francisco. It was demolished and rebuilt, one section at a time, as traffic continued to flow.



Much of this work occurred within inches of residential and commercial buildings.

The two-mile-long east span is being completely rebuilt. When finished, the new bridge will consist of several sections, but will appear as a single streamlined span. The new structure will feature the world's longest self-anchored suspension (SAS) span, connected to an elegant roadway supported by piers (skyway), which will gradually slope down toward the Oakland shoreline to make its "touchdown."

The SAS will be the first bridge of its kind constructed with a single tower. The innovative design features state-of-the-art seismic safety elements. It will also give the east span a graceful, modern, streamlined appearance that will fit well into a region recognized for its breathtaking skylines and bridges.

The traffic lanes of the east span will no longer include upper and lower decks. Instead the lanes will be parallel, providing motorists with expansive views of the bay. A new path on the south side of the

bridge, extending to Yerba Buena Island, will also allow bicyclists and pedestrians to enjoy the view.

The new span will be aligned north of the existing bridge to allow traffic to continue flowing on the existing bridge as crews build the new span. A new transition structure on Yerba Buena Island (YBI) will connect the SAS to the YBI tunnel, and will transition the east span's side-by-side traffic to the upper and lower decks of the tunnel and west span.

When construction of the new east span is complete, and vehicles have been safely rerouted to it, the original east span will be demolished.

To view the current status of the construction, download the latest version of Google Earth and turn on the three-dimensional buildings listed in the left-hand toolbar. Then just "fly" down into the Bay Area.

You can't miss it.

For more information visit <http://baybridgeinfo.org/> or e-mail Bart Ney at [bart\\_ney@dot.ca.gov](mailto:bart_ney@dot.ca.gov). 





*Most of California's state highways were built during the 1960s and 1970s and have exceeded their design lives, which has motivated Caltrans to shift focus from new highway construction to the rehabilitation of existing facilities.*

The agency faces a challenge in finding economical ways to renew deteriorating roadways in metropolitan areas. Highway rehabilitation projects often cause congestion, safety concerns and limited access for road users.

In response to this dilemma, the Caltrans Division of Research and Innovation (DRI) launched a research project in 1999 to address and resolve this national problem. Through the continuous work of researchers at Caltrans and the Institute of Transportation Studies at the University of California, Berkeley, the first version of Construction Analysis for Pavement Rehabilitation Strategies (CA4PRS) was developed.

CA4PRS is a software program that analyzes traffic and construction durations for reconstruction of highway projects in congested urban zones. It determines efficient construction timeframes and selects accurate traffic management plans.

*By Michael Samadian,  
Caltrans Senior Transportation Engineer  
Photos provided by Caltrans District 8*

# PAVEMENT RE



*Left: An operator inspects a milling drum of a cold planer, which is used to mill out the base of a road prior to asphalt concrete pavement overlay under the Portland cement concrete paving.*

It was funded through California, Minnesota, Texas and Washington states' departments of transportation Pavement Technology Consortium to help road agencies, pavement contractors, and engineers coordinate and conduct pavement rehabili

tation and reconstruction projects efficiently.

Throughout the nation, there is growing recognition of the capabilities and benefits of CA4PRS. The new tool helps transportation officials determine the most effective and economical strategies for highway maintenance and rehabilitation projects. The program uses traffic counts, the number of highway closures and closure hours to predict how traffic will react to construction and determine the most cost effective repair strategy. The program quantifies road user costs and time delays including delays on neighboring routes.

As one of the lead agencies in the development of the software, Caltrans Information Technology recently approved CA4PRS as standard software for statewide implementation. Approximately 1,000 transportation engineers in 10 state transportation departments have received CA4PRS hands on user training.

As a recent research payoff, the International Road Federation granted CA4PRS a 2007 Global Road Achievement Award. In addition, the American Association of State Highway Transportation Officials (AASHTO) Technology Implementation Group is working on a nationwide promotion of CA4PRS for its state members. The Federal Highway Administration (FHWA) also

*continued on page 22*

# HABILITATION

formally endorsed CA4PRS as a “Priority, Market-Ready Technologies and Innovations” product in 2008, and recently acquired an unlimited CA4PRS group license for all 50 state transportation departments to deploy the software nationally.

The Institute of Transportation Studies of the University of California at Berkeley developed CA4PRS. It was funded through the FHWA pooled-fund, multistate consortium consisting of California, Minnesota, Texas, and Washington.

The program incorporates three interactive analytical modules: a schedule module that calculates project length, a traffic module that quantifies the delay of work zone lane closures on the traveling public, and a cost module that estimates the price.

CA4PRS users can evaluate “what if” scenarios for alternative rehabilitation strategies, including pavement cross-sections and material types, construction windows and lane closure tactics, and contractor logistics and constraints. CA4PRS has helped agencies, contractors and consultants save engineering time, improve accuracy of estimates,

and streamline teamwork. CA4PRS enhancements include analyzing strategies for roadway widening and bridge/interchange replacement.

Since 1999, several major highway rehabilitation projects in California, Washington and Minnesota have confirmed the capabilities of CA4PRS. It has been successfully used on several urban freeway rehabilitation projects with high traffic volume, including projects on Interstate 10/Pomona and I-710 in Long Beach. More recently, CA4PRS was used with traffic simulation models to select the most economical rehabilitation scenario for the I-15 Devore Project. The 2.8 mile concrete pavement reconstruction project would have taken 10 months using traditional nighttime closures. However, using the CA4PRS analysis allowed construction to be completed during two nine-day periods using one roadbed, continuous closures with counter-flow traffic and around-the-clock construction. Implementing continuous closures, rather than repeated nighttime closures, resulted in significant savings: \$6 million in agency costs and \$2 million in road user costs in this project.

For more information, e-mail Michael Samadian at [Michael.M.Samadian@dot.ca.gov](mailto:Michael.M.Samadian@dot.ca.gov). 

**Below:** Crews place dowels in a lane before Portland cement concrete is poured to prevent cracking under the stress of heavy truck traffic.





*This vibrant floral display is on the southbound side of the Pasadena Freeway (State Route 110) in the Chinatown section of Los Angeles, a bit north of Sunset Boulevard.*

# California's Highways

## *Finding a Creative Way to Blossom*

*By John Robin Witt, Caltrans Journal Editor*

A new public-private partnership to improve the appearance of areas surrounding freeways is spreading throughout California. The innovative approach provides private sponsors an opportunity to make California's highways more attractive — while giving Caltrans' partners a bit of a green commercial push.

Modeled after the highly successful Caltrans Adopt-A-Highway Program, the new Enhanced Landscape Planting (ELP) demonstration program, enlists sponsors to install and maintain highly detailed plantings along state highways and freeways in the Los Angeles, San Diego, Orange County and San Francisco Bay areas.

While government revenues are shriveling, Toyota Motor Corporation and Greenroad Media, along with the Los Angeles Conservation Corps and several other private concerns, are cultivating more attractive urban roadways while improving the Department's bottom line as Caltrans' first ELP partners.

Toyota is only the first of many potential sponsors, and it has chosen to use the "Floralscape" concept, which uses computer-generated patterns to guide landscapers in positioning flower masses into complex scenes along the right-of-way. The program does not specify this type of planting. Rather, the ELP allows for more detailed planting to be installed.

The Caltrans Office of Landscape Architecture, under the leadership of Keith Robinson, worked for many years to develop a public-private partnership to reduce roadside maintenance costs, improve the maintenance of existing roadside planting, and maintain the state's investment in roadside improvements.

"We have been very creative in trying to implement Assembly Bill 3132 since its passage in 1994," said Robinson, Principal Landscape Architect in Sacramento. "The legislation allowed for the installation of planted logos within state right-of-way."

*continued on page 24*

"Careful plant selection, use of the latest irrigation technology, and stringent water management techniques will provide for an attractive roadside not possible with limited state resources," Robinson added.

The legislation was intended to provide maintenance for existing landscaped areas in exchange for sponsor recognition through logos of businesses or other entities. However, the state law conflicted with federal regulations that prohibit the use of highway right-of-way for advertising purposes. The legislation expired in 2002, and the program languished until Greenroads Media came to Caltrans in 2007 in an attempt to revive the spirit of the original legislation, but in a way that would not run afoul of federal or state restrictions.

Caltrans now has a useful concept that works for all the involved parties. In the Los Angeles area, for example, it means colorful roadside flower displays that the private partners design, plant and maintain — at no cost to the state.

The first of these plantings was unveiled in August 2009 on the Pasadena Freeway (State Route 110 at Cesar Chavez/Sunset Avenue). Two others are planned on the Santa Monica Freeway (I-10) westbound at Lincoln, eastbound I-10 at National/

*Below: Caltrans officials see this partnership as a way to save tax dollars, upgrade aging irrigation systems, showcase solar-powered lighting and control insects and fungus.*



*Above: Modeled after the Adopt-A-Highway Program, the partnership will reduce maintenance costs and improve the quality of existing roadside planting along California roadides.*

Overland, and one each on other Los Angeles-area interstates: Ventura Freeway (US 101) northbound at Louise Avenue, San Diego Freeway (I-405) northbound at Orange Avenue, Pomona Freeway (SR-60) westbound at Lorena Sreet, and Foothill Freeway (I-210) which is not yet confirmed. Bay Area scapes are scheduled for the Redwood Freeway (US 101) at Rowland Boulevard and the Junipero Serra Freeway (I-280) in Santa Clara.

"Through this innovative partnership with Toyota, we are able to improve the look of freeway landscaping, make necessary upgrades to aging or damaged irrigation systems, and save tax dollars," said Raja Mitwasi, Chief Deputy Director for Caltrans District 7, which encompasses Los Angeles and Ventura counties.

The first ELP site is almost one-quarter acre in size, is irrigated with non-potable water, uses solar-generated electricity for lighting, and employs ecologically responsible insect and fungus control.

And, what does Caltrans get in return? It receives greater attention to roadside maintenance because the ELP partner is responsible for roadside maintenance for an area of three to 10 acres, or more, as appropriate for each ELP site.

Caltrans also gains valuable assistance in protecting slope stability along highways, better water quality, and improved highway aesthetics. New plantings must conform to existing landscape themes and acknowledge the need to conserve California's precious water resources. In addition, the ELP partner will keep the interstate right-of-way clear of litter and weeds.

Here's how the first ELP partnership came together. Greenroad Media worked out a relationship between businesses and Caltrans, to help beautify the highway under the new ELP Program guidelines. It then worked with Caltrans employees to locate appropriate and safe high-traffic and high-visibility sites along the highway to create Floralscapes composed of vivid flowers, plants and other natural materials.

In the Los Angeles area, Greenroad Media completed computer-generated patterns for Floralscape plantings on the roadside, consisting of thousands of individual plants that attempt to convey sustainable or "green" concepts.

Using their own Living Pixel System™, Greenroad Media composed computer-designed images that serve as the template for the roadside floral works of art that can be customized for each sponsor. This technology produces a pixilated graphic that guides the installation of the roadside floral displays. The computer program creates a grid system in which each pixel represents a single flowering plant. Each flower is then planted in a precise spot in "eco-crates" made from recycled plastic. The roadside plantings are "refreshed" three times during a four-month period, then replaced for another 16 weeks.

And the floral works create "green sprouts" in the economy. The flowers and plants are grown, assembled, installed and maintained by local businesses, which helps California's economy to bloom. Moreover, sponsors pledge to revitalize and make permanent improvements around



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***Above:** Los Angeles Mayor Antonio R. Villaraigosa, along with officials from Caltrans and its private partners, announce an initiative to install colorful roadway displays on California freeways. The partnership will allow private firms to plan, plant and maintain plots at no cost to Caltrans.*

each Floralscape by planting new shrubs and updating damaged irrigation systems.

Areas surrounding the Floralscapes will be maintained by the nonprofit Los Angeles Conservation Corps, which provides training, education and work experience for at-risk young adults and school-aged youths.

Other private partners include:

- Altman Plants, which grows most of the flowers at its Perris and Vista facilities in Southern California.
- Cal Blend Soils of Irwindale prepares the site and installs the plants.
- SQLA, a landscape architecture firm, works on the Floralscapes and other submissions for the permitting process.
- Rain for Rent provides the water tank and solar pumps for irrigation.

The ELP Program will run through March 2011 when Caltrans will assess the program and determine whether to continue it. **CTJ**



## **SAVE LIVES AND SLOW FOR THE CONE ZONE**



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