

The Interstate Highway System in California:

Saving Lives, Time and Money

*A report on the condition, impact, use and future needs of
California's Interstate Highway System*

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TRIP
1726 M Street, NW, Suite 401
Washington, DC 20036
Phone: (202) 466-6706
Fax: (202) 785-4722
www.tripnet.org

Founded in 1971, TRIP of Washington, DC is a nonprofit organization that researches, evaluates and distributes economic and technical data on highway transportation issues. TRIP is supported by insurance companies, equipment manufacturers, distributors and suppliers; businesses involved in highway engineering, construction and finance; labor unions; and organizations concerned with an efficient and safe highway transportation network.

Executive Summary

Fifty years ago the nation embarked on its greatest public works project, the construction of the Interstate Highway System. President Dwight D. Eisenhower provided strong support for the building of an Interstate Highway System that would improve traffic safety, reduce travel times and improve the nation's economic productivity.

Serving as the most critical transportation link in the state's economy, California's Interstate highways have significantly improved the lives of the state's residents and visitors. In California, and throughout the nation, the Interstate system allows for high levels of mobility by reducing travel times and providing a significantly higher level of traffic safety than other routes.

But 50 years after President Eisenhower articulated a vision for the nation's 20th century transportation system, California and the nation again face a challenge in modernizing the system of aging, increasingly congested Interstate highways. If California residents are to continue to enjoy their current level of mobility on Interstate highways and bridges, the state will need to make a commitment to providing the public with a 21st Century highway system.

In this report, TRIP looks at the history and benefits of California's Interstate Highway System, its current use and condition and the future needs of the state's most critical transportation system. Sources of data for this study include the U.S. Department of Transportation (USDOT), the Federal Highway Administration (FHWA), the National Highway Traffic Safety Administration (NHTSA), the Transportation Research Board, the U.S. Census Bureau, the California Transportation Commission, the Office of the Governor, the Business, Transportation and Housing Agency, the California Department of Transportation (Caltrans), the (California) Legislative Analyst's Office, the Public Policy Institute of California, and the Texas Transportation Institute. The major findings of the report are:

Without the Interstate Highway System, Californians would waste a significant amount of fuel and time on the roads, and pay higher prices for basic services.

- The state's Interstates save the average California resident \$2,766 per year in reduced accident-related costs, the value of time saved, reduced motor fuel consumption and reduced consumer expenses for apparel, food, housing and transportation. The total statewide savings is approximately \$99.3 billion.
- Improved traffic safety provided by the Interstate system saves the state \$3.2 billion annually and the average state resident \$88 annually in reduced healthcare costs and costs associated with lost productivity.
- By reducing travel times, the Interstate system saves each California resident 74 hours of travel time annually – 2.7 billion hours statewide.

- Because it provides more efficient and direct routes, the Interstate system saves California residents approximately \$42.6 billion annually in the value of saved time and fuel – \$1,185 per person (\$1,097 in time and \$88 in fuel).
- California’s Interstate system annually reduces statewide motor fuel consumption by approximately 1.3 billion gallons.
- Consumer costs have been significantly lowered by the Interstate Highway System. The cost of transporting goods has been reduced because the time it takes to make trips has been decreased.
- TRIP estimates that consumer costs in California for apparel, food, housing and transportation are reduced by \$53.6 billion annually, or \$1,493 per state resident, as a result of the Interstate Highway System.
- TRIP’s estimates of reduced consumer costs are based on consumer expenditure estimates by the U.S. Department of Labor and estimates of the Interstate’s impact on consumer costs collected in a survey of transportation economists.

Today, three-quarters of California’s urban Interstates are congested as a result of continued growth in travel.

- Seventy-five percent of California’s urban Interstates are considered congested because they carry traffic levels that result in significant delays during peak travel hours.
- California’s urban interstates are the busiest in the country, with the highest amount of traffic per lane mile among all states. The average lane mile of urban Interstate carried 22,264 vehicles per day in 2004.
- Travel is increasing at a rate five times faster than capacity has been added. Vehicle miles traveled on California’s Interstates between 1990 and 2004 increased 36 percent, from approximately 66 billion to 90 billion miles traveled. Between 1990 and 2004, the number of lane miles increased by 7 percent (from 13,854 to 14,772), but travel per lane mile increased by 28 percent during that period.

California faces a significant challenge over the next 20 years in maintaining the physical condition of its aging Interstate system and expanding Interstate capacity to address growing traffic congestion.

- Vehicle miles of travel in California have increased by 457 percent since Interstate construction began in 1956. Since 1956, the number of vehicles has increased by 380 percent, and the state’s population has increased by 163 percent.

- By the year 2026, travel on California's Interstate highways is expected to increase by 40 percent.
- In ten years, daily congestion is expected to increase by 35 percent.
- Not only will California's population-dense regions experience worsening congestion, severe congestion will be seen in the Inland Empire and the northern Central Valley.
- Urban traffic in some areas of California has reached capacity, resulting in a growth in the duration of severe congestion. As population, vehicles, and travel grow, peak periods of congestion will increase in duration.
- With increasing congestion and duration of peak periods, the Interstate highway system will be challenged to deliver the cost benefits associated with enhanced mobility.
- Increasing urban traffic congestion—combined with a projected 187 percent increase in the dollar value of exports by 2020—may erode the logistics advantages that California producers, distributors, and ports have over competitors as the cost and reliability of shipping goods is negatively affected.
- Transportation programs are losing ground. The gas tax value has deteriorated over time and is inadequate to fund existing, planned preservation projects. The sales tax on gasoline goes toward system improvements (the STIP), but does not now fund the STIP program at its level five years ago.
- Current transportation funding sources will not address even short-term needs, estimated by the Governor's Office at \$45 billion by 2011.

Deficiencies exist on California's Interstate roads and bridges.

- Thirteen percent of California's Interstate pavements are in poor condition and an additional 25 percent are in mediocre condition. Another 19 percent of Interstate pavements are in fair condition and the remaining 42 percent are in good condition.
- Thirteen percent of the California's Interstate bridges are rated structurally deficient and another 12 percent are rated functionally obsolete.
- A bridge is structurally deficient if there is significant deterioration of the bridge deck, supports or other major components. Bridges that are functionally obsolete no longer meet current highway design standards, often because of narrow lanes, inadequate clearances or poor alignment.

California's Interstates provide a network of highways with a variety of safety designs that greatly reduce the likelihood of serious accidents. Travel on California's Interstate highways is more than twice as safe as travel on all other roadways in the state.

- California's Interstate highways have saved approximately 25,000 lives in the state since 1956, based on an estimate of the number of traffic deaths that would have occurred if California did not have Interstate highways.
- The number of lives saved by the Interstate was calculated by estimating the additional fatalities that would have occurred had Interstate traffic been carried by other major roadways in the state, which often have higher traffic fatality rates and may lack the safety features common to Interstate routes.
- California's Interstate system has saved an average of 550 lives per year over the last 10 years, based on the above criteria.
- The features that make Interstates safer than other roads include: a separation from other roads and rail lines, a minimum of four-lanes, gentler curves and often paved shoulders, median barriers and rumble strips to warn drivers when they are leaving the roadway.
- Travel on California's Interstate highways is approximately twice as safe as travel on all other roadways. The fatality rate per 100 million vehicle miles of travel on California's Interstate system in 2004 was .68, while it was 1.47 on non-Interstate routes in California.
- There were 612 traffic fatalities on California's Interstate highways in 2004. Only 15 percent of the 4,120 traffic fatalities that occurred in California in 2004 were on the Interstate system, even though it carried 27 percent of all travel in the state in 2004.

The Interstate system is the backbone of the California economy and has played a critical role in improving business productivity in the state.

- Every year, \$924 billion in goods are shipped annually from sites in California and another \$894 billion in goods are shipped annually to sites in California, mostly by truck.
- Sixty-eight percent of the goods shipped annually from sites in California are carried by trucks and another 19 percent are carried by courier services, which use trucks for part of the deliveries. Similarly, 69 percent of the goods shipped to sites in California are carried by trucks and another 15 percent are carried by courier services, which use trucks for part of their deliveries.
- The Interstate system has led to significant increases in economic productivity. Improvements in the highway system have allowed businesses to adopt more efficient logistics practices, which reduce costs for producers and consumers.

- The initial construction of much of the Interstate system provided a tremendous boost to business productivity as a result of more efficient goods shipment. Economists have estimated that from the initial phase of Interstate construction in 1956 to 1970, the annual rate of return for every dollar of public investment in highway construction was 54 cents, which meant that investments recovered their costs in two years.
- The completion of the vast majority of the Interstate system by the 1980s and the deregulation of the U.S. trucking industry resulted in a significant improvement in the competitiveness of U.S. business. In fact, the cost of moving freight, as measured by U.S. business logistics costs, dropped from 16 percent of U.S. Gross Domestic Product (GDP) in 1980 to nine percent in 2002.

The Dwight D. Eisenhower National System of Interstate and Defense Highways, which has been called the most ambitious public works project built since the Roman Empire, is the most critical link in the nation's and California's transportation system.

- Construction of the Interstate system in California started in 1956 and was completed in 1994, providing the state with 25 Interstate routes totaling 2,458 miles, linking the state's largest urban areas and connecting California to the rest of the nation.
- I-80 opened on June 24, 1957, becoming the first California freeway opened under the Federal Highway Act of 1956. However, I-10 was the first California interstate project to go to construction with Interstate construction funds under the 1956 Act.
- The most recent section of California's Interstate system open to traffic I-105, the Century Freeway, completed in 1994. The 17.3-mile freeway extends from Los Angeles International Airport to Norwalk.
- By 1986 the majority of the state's Interstate system was completed: 97 percent of the center-lane miles (2,389 of the eventual 2,458 total) and 92 percent of lane miles (13,663 of today's 14,777 lane miles) had been built.
- California's Interstate system includes just four percent of all roadway lane miles in the state but carries 27 percent of all vehicle travel in the state.

Introduction

The Dwight D. Eisenhower National System of Interstate and Defense Highways has been called the most ambitious public works project built since the age of the Roman Empire. It is literally the backbone of America's economy.

Initially conceived in 1939, significant construction of the Interstate system did not start until 1956 when Congress approved the financing of today's Interstate system, largely through collection of the federal motor fuel tax and other taxes on highway users.

With 25 Interstates connecting the state's major urban areas and extending to other U.S. states and Mexico, California's Interstate Highway System is the most critical element of the state's transportation network. Fifty years after construction of the Interstate Highway System began, this network of highways has become the most important set of corridors linking California's citizens to people and businesses within the state and throughout the nation.

Today, the Interstate system continues to provide California with economic growth, improved traffic safety and convenient access while playing a role in the nation's defense.

In this report, TRIP looks at the history and impact of California's Interstate Highway System, its current use and condition, the system's benefits and the future needs of the state's most critical transportation system. Just as 50 years ago, when our leaders made critical decisions on the future of the nation's highway system, today's political leaders now face the challenge of insuring that the safety and reliability of the Interstate system are maintained by investing adequately in needed repairs and improvements to meet the transportation challenges of the 21st Century.

Development of the U.S. Interstate System

In 1919, Lieutenant Dwight D. Eisenhower participated in the U.S. Army's first transcontinental motor convoy, from Washington, DC to San Francisco. During the 62 days it took to cross the country, the convoy experienced numerous difficulties, including roads that were muddy, narrow or otherwise inadequate and bridges that often could not support the vehicles in the convoy.

A generation later, General Eisenhower saw first hand how an efficient, effective highway transportation system benefited a nation, when he noted that the German Autobahn network, opened in 1935, provided a significant military advantage to Germany.

The United States also began exploring the feasibility of constructing a series of interregional highways in the late 1930s. In 1938 Congress directed the then Bureau of Public Roads (BPR) to prepare a study on the possibility of building a national system of toll highways. The resulting 1939 BPR report concluded that it would be impossible to finance a national system of highways strictly through charging tolls, but did recommend that the U.S. build a system of approximately 26,700 miles of transcontinental highways. The BPR report also called for many of the design elements found on modern Interstate highways, including limited access, which separates highway traffic from other traffic and from trains. The BPR report also suggested that the nation's highways should connect with the center of large cities, should include beltways around large urban areas and should bypass small towns.

Further attempts to develop a national highway system were interrupted by World War II. But as the Allies gained the upper hand in the war, Congress started to turn its

attention to post-war challenges, including consideration of a modern highway system to support the nation's growing economy and improve safety and mobility. The Federal-Aid Highway Act of 1944 authorized the BPR to designate a system of approximately 40,000 miles of Interstate highways, which proved very similar to the routes approved ultimately as the national Interstate system. But the 1944 highway bill did not specify any additional funds for construction of the highways, other than the small amount of funds currently made available by the federal government for highway construction.

The 1944 Highway Act had identified the need for a national system of interconnected highways, but had left out a key piece of the puzzle – how to fund a uniformly-designed national highway system, which would have significant differences in construction costs and traffic volume, depending on location. Even without significant federal funding available, cities and states began to move forward on their own, with some additional highway networks being built or planned in current Interstate corridors under various financing mechanisms. These early highway projects included toll highways such as the Pennsylvania Turnpike and the New York Thruway and early urban highways including the Los Angeles Freeway System and the Detroit Expressway System.

But for most motorists and businesses, the inadequate roadway system of the late 1940s and early 1950s contributed to growing human and economic losses, as cars and trucks jostled for position on the nation's inadequate, narrow and winding roads and streets.

In 1954 President Eisenhower appointed a committee to draft a proposal to fund a national system of Interstate Highways. Eisenhower noted that the nation's obsolete

highway system penalized Americans through increased traffic deaths, the waste of time caused by traffic delays, the increased cost of freight movement and the inability of the nation's highways to meet the mobility demands that would be caused by a regional catastrophe or national defense emergency.

The initial plan prepared for President Eisenhower called for funding a national Interstate Highway System through bond financing, but Congress dismissed the use of bond revenue as the primary source of Interstate financing. In 1956, Congress overwhelmingly approved the construction of a national Interstate Highway System when the financing was changed to a pay-as-you-go format that would collect a series of user fees -- most notably a 3 cent-per-gallon tax on motor fuel -- into a national Highway Trust Fund.

The Federal-Aid Highway Act of 1956 called for the construction of a 41,000-mile Interstate Highway System, which was to be completed by 1970 at a cost of approximately \$27 billion. The design of the system was very similar to the initial 1944 plan, which called for connecting large urban areas, including routing highways into central cities, largely at the request of mayors and other local politicians who feared that their communities would be left behind without modern highway access. The Interstate system was designated to incorporate approximately 2,000 miles of existing highways, including many miles of California highways.

The Construction of the Interstate System in California

California's freeway system was well underway when the federal government designated the national Interstate Highway System. The state already had built many

limited-access highways and now-famous cloverleaf interchanges which were a marvel of engineering in their time.

Following the June 29, 1956 signing of the Federal-Aid Highway Act of 1956 by President Eisenhower, 1,938 miles of California's existing and planned freeway routes were designated as Interstates. The original routes included I-5, I-8, I-10, I-15, US 40, I-80, I-505, and I-580. In addition, 197 miles of auxiliary routes (such as I-710, I-805, and I-880) were added, bringing the state's total allotment of Interstate miles to 2,135.¹

I-80 opened on June 24, 1957, becoming the first California freeway opened under the Federal Highway Act of 1956. Extended to accommodate the 1960 Winter Olympics in Squaw Valley, nearly 50 miles of four-lane freeway were constructed in just 18 months, converting old US-40 into I-80. It would take several more years until I-80 pushed through the Sierras and over Donner Summit, an engineering effort lauded as one of the two best of 1964.²

Another "first" construction project was I-10, the first California interstate project to go to construction with Interstate construction funds under the 1956 Act.³

The most recent section of California's Interstate system to be completed was the Glenn Anderson (Century) Freeway, I-105. The 17.3-mile freeway extends from Los Angeles International Airport to Norwalk. Hailed as California's last freeway, construction began in 1982 and the freeway opened, in sections, in 1993 and 1994.

Today California has 2,458 miles of Interstate routes. Most of the network of highways and bridges was in place by 1986, by which time 97 percent of the center-lane miles (2,389 of the eventual 2,458 total) and 92 percent of lane miles (13,663 of an eventual 14,777 lane miles) had been built. By 1996, 99 percent of center-lane miles and

97 percent of lane miles were completed. Lane miles are the total number of lanes multiplied by the length. Thus, a 10-mile segment of four-lane highway equals 10 center-lane miles and 40 lane miles.

Regulations and Design Define An Interstate Highway

The distinctive red, white and blue shield designates that the route traveled is an Interstate highway. What defines the Interstates, however, is a matter of federal regulation and design standards.



A set number of miles was designated as the Interstate system in 1956, with allocations of miles for each state.

The intent of a national system was to provide an effective highway transportation system that benefited the nation by connecting major cities in all the states and by increasing safety and reducing travel time. The highways, therefore, were built to high design standards that would reduce traffic deaths and increase the speed and amount of traffic that could be carried. The specific safety-design standards include:

- A separation from other roads, streets and rail lines,
- Full access control to limit entrance and exit to on and off ramps,
- A minimum of four lanes to prevent the need to enter oncoming lanes to pass,
- Medians to separate oncoming lanes, and
- Moderate curves.

Most Interstate highways also have paved shoulders, and many have median barriers to avoid cross-over accidents, and rumble strips to warn drivers if they are leaving the roadway.

Interstate standards are uniform across the entire system and are as great a boon to commerce as to safety. As an example, a distribution manager shipping electronic parts from California to New Jersey will know what to expect of the roadway width, overpass height and other conditions to move goods from state to state, and will chose routes accordingly.

The Interstate System in California includes these routes. Primary Interstates (main north/south and east/west routes) are in boldface:

Route	Total Miles
I-5	796.53
I-8	169.92
I-10	242.54
I-15	287.26
I-40	154.61
I-80	199.24
I-105	17.32
I-110	20.43
I-205	12.97
I-210	48.72
I-215	54.50
I-238	2.23
I-280	57.22
I-305	8.44
I-380	3.30
I-405	72.15
I-505	32.98
I-580	75.63
I-605	27.40
I-680	70.52
I-710	19.66

I-780	6.50
I-805	28.02
I-880	47.22
I-980	2.03
25 Routes	2,457.34

Source: FHWA, Route Log and Finder List, Table 3

Maps of California Interstate routes are available on the FHWA Website:
<http://www.fhwa.dot.gov/hep10/nhs/>

Trends in Interstate Travel and Capacity

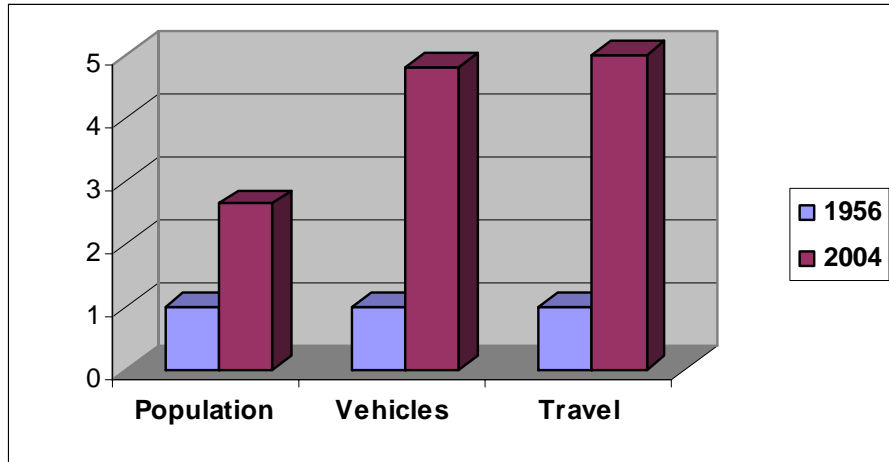
California is served by 25 Interstate routes.⁴ Nineteen of California's Interstate routes link heavily populated regions within the state and support the six primary Interstate routes that connect California with Oregon, Nevada, Arizona and Mexico. The primary routes are: Interstates 5, 8, 10, 15, 40 and 80.

Three of the nation's five longest Interstate routes originate in California: I-80: 2,900 miles, from San Francisco, California, to Teaneck, New Jersey (second longest in the nation), I-40: 2,555 miles, from Barstow, California, to Wilmington, North Carolina (second longest in the nation), and I-10: 2,460 miles, from Los Angeles, California to Jacksonville, Florida (third longest in the nation).⁵

Since the beginning of the Interstate Era 50 years ago, California has seen enormous increases in population, the number of motor vehicles and the amount of vehicle travel. From 1956 to 2004 (the latest year for which data is available), the state's population has increased by approximately 163 percent from approximately 13.7 million to 35.9 million, the number of motor vehicles increased by 380 percent from

approximately 6.5 million to 31.4 million and vehicle travel in California has increased by 457 percent from approximately 59 billion miles driven annually to 329 billion miles.⁶

Chart 1. Increase since 1956 in Population, Vehicles and Travel in California (1 = 1956 level)



Source: TRIP analysis of U.S. Census and Federal Highway Administration data

Traffic Congestion on California's Interstates

The Interstate Highway System was initially designed largely to provide transportation between the nation's urban areas and to support national defense. But as Interstate highways were ultimately built around and through many cities, they became the nation's most critical transportation corridors both between and within urban areas.

Today, the Interstate Highway System remains the most critical component of California's transportation system. While Interstate highways account for only four percent of all lane miles of roads in the state, they carry 27 percent of all travel in the state.⁷

Travel on California's Interstate system is increasing at a rate five times faster than capacity has been added. Vehicle miles traveled on California's Interstates between

1990 and 2004 increased 36 percent, from approximately 66 billion to 90 billion miles traveled. Between 1990 and 2004, the number of Interstate lane miles increased by seven percent (from 13,854 to 14,772), but travel per lane mile increased by 28 percent during that period.⁸

This increase in traffic on California's Interstate highways has resulted in a significant increase in traffic congestion levels. California's urban interstates are the busiest in the country, with the highest amount of traffic per lane mile among all states. The average lane mile of urban Interstate carried 22,264 vehicles per day in 2004.⁹

Fully three-quarters (831 of 1,110 miles) of California's urban Interstates are considered congested because they carry traffic levels that result in significant delays during peak travel hours.¹⁰ According to the Texas Transportation Institute, these five California urban areas rank in the top 15 most congested in the nation¹¹: Los Angeles, San Francisco-Oakland, San Diego, San Bernardino-Riverside and Sacramento.

The Federal Highway Administration considers any Interstate highway that carries more than 80 percent of its design capacity to be congested, because at this level of traffic, vehicles experience significant delays in traffic flow. When Interstate traffic reaches 95 percent of the highway's design capacity, the route is rated as being severely congested, because vehicles are likely to experience stop and go traffic and any incident can be expected to cause a serious breakdown of traffic flow.

Freight Shipment by Large Trucks on California's Interstate Highways

Every year, \$924 billion in goods are shipped from sites in California and another \$894 billion in goods are shipped to sites in California, mostly by trucks.¹² In fact, 68

percent of the goods shipped annually from sites in California are carried by trucks and another 19 percent are carried by courier services, which use trucks for part of their deliveries.¹³ Similarly, 69 percent of the goods shipped to sites in California are carried by trucks and another 15 percent are carried by courier services, which use trucks for part of their deliveries.¹⁴

California’s Interstate Highway System is critical for goods shipment. Nationally, Interstate highways account for 50 percent of travel by large trucks.¹⁵

The following map shows total combined truck flows to and from California, underscoring the importance of the Interstates for goods movement within the state and the importance of California’s goods movement infrastructure to the rest of the nation.

Chart 3: Total Combined Truck Flows To/From California, 1998



Source: Goods Movement Action Plan, 2005¹⁶

California's Interstate Highway System is an integral component of the global goods movement network. California has become the primary point of arrival and departure for goods entering and leaving the country: half the cargo entering California from foreign countries is shipped through California to other states.¹⁷

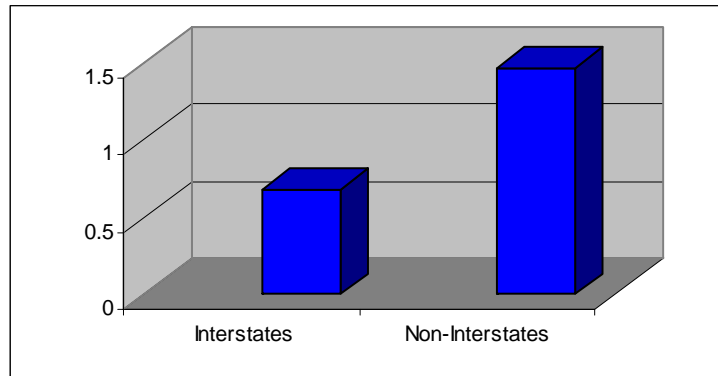
The ports of Long Beach and Los Angeles experienced a seven percent per year increase in volume between 2000 and 2004; this growth is projected to continue.¹⁸ While the state's international ports have expanded to accommodate larger ships and provide more dockside facilities, it is the infrastructure outside the ports that constrains trade.¹⁹ Traffic congestion hampers "just in time" delivery, which operates on an international scale in California.

Traffic Safety on California's Interstate Highways

Perhaps the most significant benefit of the Interstate system is that it has greatly improved traffic safety in California and throughout the U.S. by providing travelers with a network of highways with a variety of safety designs that greatly reduce the likelihood of serious accidents.

The result of the high level of safety design standards on the Interstate is that travel on California's Interstate highways is much safer than travel on all other roads and highways in the state. The traffic fatality rate per 100 million vehicle miles of travel on California's Interstate highways was 0.68 in 2004, the latest year for which data is available. The fatality rate per 100 million vehicle miles of travel in 2004 on California's non-Interstate routes was 1.47 – more than twice the rate on the state's Interstates.

Chart 4. Fatality rate per 100 Million Vehicle Miles of Travel for California’s Interstate and Non-Interstate roadways, 2004



Source: TRIP analysis of FHWA data

California’s Interstate Highway System, which carried 27 percent of the state’s travel in 2004, accounted for less than 15 percent of the state’s fatalities as a result of its superior traffic safety features. There were 612 traffic fatalities on California’s Interstate highways in 2004 – 14.8 percent of the 4,120 traffic fatalities which occurred in California in 2004.²⁰

Pavement Conditions of California’s Interstate System

The lifecycle of highway pavements is greatly affected by a transportation agency’s ability to perform timely maintenance and upgrades to ensure that surfaces remain smooth for as long as possible. The pavement condition of a state's major roads are evaluated and classified as being in poor, mediocre, fair or good condition. A desirable goal for state and local organizations that are responsible for road maintenance is to keep 75 percent of major roads in good condition.²¹

In 2004 (the latest year for which data is available), 13 percent of pavements on California’s Interstate highways were rated in poor condition and 25 percent were rated

in mediocre condition.²² Roads rated in mediocre condition show signs of significant wear and may also have some visible pavement distress. Most pavements in mediocre condition can be repaired by resurfacing, but some may need more extensive reconstruction to return them to good condition. In California, 19 percent of Interstate pavements are rated in fair condition and the remaining 42 percent of Interstate pavements are rated in good condition.²³

Pavement deterioration is caused by a combination of traffic, moisture and climate. Moisture often works its way into road surfaces and the materials that form the road's foundation. Road surfaces at intersections are even more prone to deterioration because the slow-moving or standing loads occurring at these sites subject the pavement to higher levels of stress. It is critical that roads are fixed before they require major repairs because reconstructing roads costs approximately four times more than resurfacing them.²⁴

Bridge Conditions of California's Interstate Highways

California has 3,761 bridges on its Interstate system. While some are roadway overpasses, others are much more significant structures. California's most famous bridge, the Golden Gate Bridge, is not part of the Interstate system.

Approximately 13 percent of bridges (505 bridges) in California's Interstate system are rated structurally deficient and 12 percent (440 bridges) are rated functionally obsolete.²⁵

Bridges that are rated structurally deficient show significant signs of deterioration as a result of use and exposure. The FHWA defines a structurally deficient bridge as one that requires immediate rehabilitation to remain open, is restricted to carrying lighter-weight vehicles or is closed. Bridges that are rated functionally obsolete do not meet current design standards, which may result in reduced traffic safety, compared to a bridge meeting current standards. Functionally obsolete bridges are defined by the FHWA as those that have deck geometry, load carrying capacity, clearance or approach roadway alignment that no longer meet the criteria for the system of which the bridge is a part. While three-quarters of the state's Interstate bridges are generally in acceptable condition, a large number of these bridges are reaching an age when they will soon require significant repairs and in some cases replacement. The average lifespan of an older bridge is 50 years.²⁶ Older bridges often need significant repairs or rehabilitation or may need to be replaced to continue to provide adequate service.

Benefits of California's Interstate System

The construction of California's Interstate Highway System has had a profound impact on the state's development, affecting the quality of life of the state's residents and visitors in numerous ways including improved safety, expanded lifestyle choices, improved business productivity and an enhanced economic standard of living.

By greatly increasing the number of areas that are within a reasonable driving distance, the Interstate system has greatly increased people's access to jobs, housing, recreation, healthcare, shopping and other amenities.

Similarly, the construction of the Interstate system has benefited the nation's economy by reducing the costs of and increasing the speed of goods movement. The ability to cheaply and quickly ship products to or from California and many U.S. and international sites has provided lower costs and greater selection to consumers and has opened up new markets to California businesses. The completion of the vast majority of the Interstate system by the 1980s and the deregulation of the U.S. trucking industry resulted in a significant improvement in the competitiveness of U.S. business. In fact, the cost of moving freight, as measured by U.S. business logistics costs, dropped from 16 percent of U.S. Gross Domestic Product (GDP) in 1980 to nine percent in 2002.²⁷

The initial construction of much of the Interstate system provided a tremendous boost to business productivity as a result of more efficient goods shipment. In fact, economists have estimated that through the initial phase of Interstate construction to 1970, the rate of return for every dollar of public investment in highway construction was 54 cents, which meant that investments recovered their costs in two years.

The continued tremendous increase in freight deliveries over recent years has been partly fueled by improved communications and the need for greater economic competitiveness. Improved communications provided by the Internet are integrating producers, wholesalers, retailers and consumers. Businesses have responded to improved communications and the necessity to cut costs with a variety of innovations, including just-in-time delivery, increases in small package delivery, demand-side inventory management and accepting customer orders through the Internet.

The result of these changes has been a significant improvement in logistics efficiency as firms move away from a push-style distribution system, which relies on

large-scale warehousing of materials, to a pull-style distribution system, which relies on smaller, more strategic movement of goods.²⁸

Interstate Benefits for Individuals in California

TRIP has calculated the annual financial benefit per person and statewide in California, based on the value of improved traffic safety, reduced travel time, reduced fuel use and reduced consumer costs.

Safety:

By carrying significant volumes of traffic on roadways with higher safety standards and lower traffic fatality rates, the Interstates save numerous lives annually. In fact, TRIP estimates that Interstate highways in California have saved an average of 550 lives per year over the last 10 years. Since 1956, Interstate highways have saved approximately 25,000 lives in California.²⁹ This estimate is based on a comparison of the annual fatality rate on California's Interstate highways compared to the fatality rate each year on other major roads in the state. Interstate safety benefits were estimated by calculating the additional fatalities that would have occurred in each year if the travel that occurred on California's Interstate highways had instead been carried by other major roads in the state, many of which often lack many of the safety features found on Interstate highways and have a significantly higher traffic fatality rate.

TRIP estimates that the improved highway safety provided by California's Interstates saves the state \$3.2 billion annually in reduced economic costs as a result of the reduction in fatal or serious traffic accidents, saving \$88 per person annually.³⁰

TRIP's estimate is based on research by the National Highway Traffic Safety

Administration (NHTSA), which annually estimates the economic costs of fatal and serious traffic accidents in the U.S. The NHTSA estimates are strictly of the economic consequences of serious and fatal traffic crashes, such as lost productivity and increased healthcare costs.

Time and motor fuel:

Because it features limited access, no stoplights and often more direct routes between major urban areas, the Interstate system has saved travelers time by reducing travel times and making travel more efficient. By reducing travel times, the Interstate Highway System also increased the choices people have of where to live, work, shop and travel for recreation.

TRIP has estimated the additional time that California residents would spend traveling if the state did not have its network of Interstate highways. These estimates assume that if there were no Interstate highways in California that this traffic would be carried by other major roads in the state, such as other urban freeways and urban and rural arterial roads and highways. Shifting the state's Interstate traffic onto other routes would increase traffic congestion on these other routes and also slow travel times by shifting travel from faster-moving Interstate highways onto slower-moving roads and highways. TRIP applied traffic speed calculations developed by the Texas Transportation Institute, which annually estimates traffic congestion levels throughout the U.S., to estimate the traffic speeds that would result on other major roads in the state if they had to carry the traffic in California currently being carried by the state's Interstate system.

TRIP found that without Interstate highways, California residents would spend an additional 2.7 billion hours annually traveling in vehicles, or 74 hours per person annually³¹ (an average of nearly 1.5 additional hours a week on the road). TRIP also found that without Interstate highways, California motorists would use approximately an additional 1.3 billion gallons of motor fuel annually.³² The total value of the time and motor fuel that are saved annually in California by the Interstate Highway System is \$1,185 per person (\$1,097 in time and \$88 in fuel), or \$42.6 billion statewide.³³

Reduced Consumer Costs:

The Interstate system has had a significant impact on consumer costs by reducing the time it takes to complete trips, thereby reducing the cost of transporting goods. It has also reduced costs by increasing access between locations, which has increased access to cheaper land and increased consumer choices for everything from housing and jobs to recreation and shopping.

To calculate the economic impact of the Interstate Highway System on individual consumers in California, TRIP has gathered data on average consumer expenditures in the state and has estimated the impact of the Interstate Highway System on these costs. Based on data from the U.S. Department of Labor and the Bureau of Economic Analysis, TRIP has calculated the average expenditure per capita in each state on apparel, food, housing and transportation.³⁴ TRIP then surveyed the nation's leading transportation economists for their estimates of the percentage reduction in consumer expenditures, as a result of the Interstate system, for apparel, food, housing and transportation. TRIP used the average estimated impact in each category to calculate the average amount saved by California consumers annually in each category.

Apparel and food costs are affected by reduced logistics costs. Transportation costs, which include the cost of a vehicle, vehicle repairs and maintenance, and the cost of fuel, are similarly affected by reduced logistics costs. The impact of the Interstate system on housing costs includes its impact on the cost of materials that are used in constructing homes as well as the impact that the Interstate system has had on lowering land prices by increasing consumer access to cheaper land, thus lowering housing costs.

TRIP estimates that the average California resident saves \$1,493 per year as a result of the Interstate Highway System. The following chart indicates the annual saving per California resident for apparel, food, housing and transportation costs as a result of the Interstate Highway System. The total annual statewide savings in California in reduced consumer costs as a result of the Interstate Highway System is estimated to be \$53.6 billion.

Chart 6. Annual, per person savings in California, as a result of the Interstate Highway System.

	ANNUAL SAVINGS IN CALIFORNIA
Apparel	\$ 55
Food	\$ 191
Housing	\$ 805
Transportation	\$ 442
Total savings per person	\$ 1,493

Source: TRIP

The Interstate Highway System provides tremendous benefits every year to the people of California. The total annual benefit per person in California of the Interstate system is \$2,766 as a result of additional safety, reduced time and fuel costs, and lower consumer expenses. The total statewide benefit in California of the Interstate Highway

System is approximately \$99 billion. The following chart shows the combined annual benefit of the Interstate system per person and statewide in California.

Chart 7. Total Annual Interstate Benefit Per Person and Statewide in California

	Per Person	Statewide (billions)
Safety	\$ 88	\$ 3.164
Time and Gas	\$ 1,185	\$ 42.526
Reduced Consumer Costs	\$ 1,493	\$ 53.573
Total	\$ 2,766	\$ 99.263

Source: TRIP

Meeting California’s Future Interstate Travel Needs

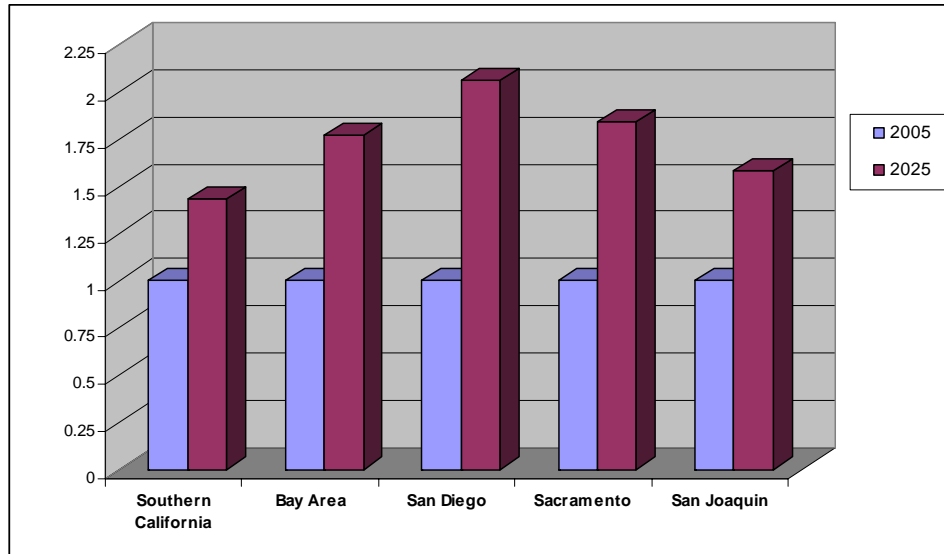
California faces a significant challenge in maintaining and rebuilding its aging Interstate Highway System and providing adequate levels of access to meet growing travel demand.

Travel on California’s Interstate highways is expected to increase by at least 40 percent by the year 2026.³⁵ The Governor’s Office projects that over the next 10 years alone, daily congestion will increase by 35 percent.³⁶ If California does nothing to address congestion, Caltrans estimates that daily hours Californians are stuck in traffic will soar from 500,000 to 750,000.³⁷

In developing the “Go California” program, an effort aimed at improving mobility in the state, planners looked at congestion projections from the Metropolitan Planning Organizations in the state’s metropolitan areas. While the greatest delays in travel will be

in Southern California, the greatest increases in traffic will be in the San Diego (106 percent increase) and Sacramento (84 percent increase) regions.³⁸

Chart XX: Metropolitan area projections for vehicle hours of delay, 2005-2025



Source: Survey of California Metropolitan Planning Organization Areas, Go California

Go California planners also looked at current congestion and projected which routes would be most severely congested in 2025. Their calculations showed that not only will the current population-dense areas of San Diego, Los Angeles and the Bay Area experience worsening congestion, they also showed severely congested routes in the Inland Empire and the northern Central Valley.³⁹

Growth in trade will continue. The Public Policy Institute of California predicts an 81 percent increase in the dollar value of imports between 2002 and 2020, and an 187 percent increase in the dollar value of exports.⁴⁰

Goods movement statewide – not just at the ports and border with Mexico – also will mushroom. For example, goods movement on Highway 99 is projected to grow 60 percent in the next 20 years.⁴¹ The State hopes to upgrade this “workhorse” highway to

Interstate standards. The north-south route serves the Central Valley and runs 400 miles from Chico to the Bakersfield area.

Increased commerce will put additional strain on California cities. Urban traffic in some areas of the state has reached capacity, resulting in increased duration of severe congestion lasting several hours during “rush hour,” and in some areas resulting in stop-and-go conditions throughout the day.⁴² The Texas Transportation Institute, which conducts an annual congestion and mobility study, has found that congestion has spread significantly over the 20 years the institute has been conducting its study. Nationally, between 1982 and 2003, the number of hours of the day when congestion might be encountered grew from about 4.5 hours to about 7.1 hours.⁴³

As population, vehicles and travel grow, the duration of peak periods will likely increase, as they have over the past two decades. With increasing congestion and duration of peak periods, the Interstate highway system will be challenged to deliver the cost benefits associated with enhanced mobility.

Upgrading the Interstate system and California’s network of state highways to accommodate population growth and improve mobility for California’s residents and businesses will take billions of dollars, funds which the state will not have under current funding scenarios.⁴⁴ Unmet needs between 2000 and 2010 were estimated at \$110 billion by the Commission on Building for the 21st Century, and Caltrans Director Will Kempton put today’s figure close to \$160 billion.⁴⁵ California’s 2006 Five-Year Infrastructure Plan says \$44.5 billion should be spent on transportation from 2006 to 2011.⁴⁶

While the federal government provided about 90 percent of the funding to build the Interstates, California has the responsibility of maintaining the system within the

state. Interstates, like other roads in the state, are eligible for federal funding, but the bulk of money for maintenance, rehabilitation and enhancement comes from State and local sources.

California's gas taxes once funded maintenance and rehabilitation plus new construction on state highways. Last year California reached a transportation funding milestone: none of the gas tax revenue goes to transportation improvements. All the funding from the state and federal gas taxes is needed for the growing maintenance and rehabilitation needs on the aging system (Interstates as well as state routes) as a result of growth in travel and declining revenue-per-mile from the existing gasoline tax.⁴⁷ The California Transportation Commission (CTC) cautions that annual revenues from the basic per-gallon fuel tax and from truck weight fees "are insufficient even to meet ongoing state highway maintenance, operations, and rehabilitation costs."⁴⁸

To supplement these funds, in 2002 California voters passed Proposition 42, dedicating the sales tax on gasoline to transportation programs. The sales tax on gasoline (not the per-gallon tax on fuel) now funds transportation improvements – the State Transportation Improvement Program (STIP) – with no supplemental funds from the gas tax. As recently as five years ago, the STIP was entirely funded with gas tax revenue, but the needs of the aging system now consume that source of revenue.

Proposition 42 funds are estimated at \$1.4 billion a year under current gasoline pricing, but these funds are vulnerable to diversion because a loophole in the original law allows the governor and legislature to use the funds for state fiscal crises, which California has had since Proposition 42 was passed. "Today, we have a program

dependent entirely on motor fuel sales taxes—lacking constitutional protection and subject to the vagaries of the annual budget process,” according to the CTC.⁴⁹

All the revenue from Proposition 42 went to transportation programs in the current fiscal year. That, added to gas taxes and other fees, allowed the California Transportation Commission to allocate \$4.2 billion for transportation projects this past year – nearly five times the amount allocated in the 2004-05 budget year (\$900 million).⁵⁰

Negotiations continue on the 2006-07 budget. Preliminary announcements indicate that the State will again allow full funding for Proposition 42 and add early repayment of more than \$1 billion in previous loans from Proposition 42 funds for transportation.

However, even with full funding for Proposition 42 from the sales tax on gasoline, the transportation improvement program is losing ground: Proposition 42 funds are not enough to meet current, much less future need. This source of funding was intended to supplement gas tax revenue, not replace it. Proposition 42 provides about half the dollars the state had allocated to the STIP ten years ago.⁵¹ The CTC estimates that there are over \$900 million in transportation improvement and preservation projects that are either ready to go and placed on the shelf or that could have been ready except for the lack of funding.

The California Legislature approved a \$37 billion infrastructure package in May. The proposal includes \$19.9 billion in general obligation bonds for transportation – funding that would be available for Interstate maintenance and enhancement. In

November, California voters will decide the fate of the infrastructure package. Among other elements, the transportation bonds they will vote on would provide:

- \$4.5 billion for corridor mobility projects to reduce traffic congestion in urban areas,
- \$2 billion for the STIP to upgrade freeways and for other transportation improvements,
- \$750 million for repairs and safety improvements, and
- \$2 billion for trade corridor projects.

Conclusion

Fifty years after construction of the Interstate Highway System began, California and all of the U.S. continues to reap tremendous benefits from the nation's most critical transportation network. California's Interstate system has saved approximately 25,000 lives since its inception in 1956 – an average 550 lives per year over the last decade. In addition to saving lives, the Interstate continues to save California residents time, fuel and money by reducing the costs of goods that improve their quality of life, including the cost of apparel, food, housing and transportation. The state's Interstate highways also play a critical role in supporting economic growth and increasing personal access to jobs, recreation, health care and housing, enhancing the lifestyle choices of the state's residents and visitors.

The safe, reliable and timely mobility provided by the state's Interstate highways has also improved the efficiency of California's businesses and is integral to the functioning of the state's economy.

Prior to the approval of the Interstate system, President Eisenhower noted that inadequate highways resulted in lost time due to traffic delays, reduced economic productivity and reduced traffic safety.

Today, similar challenges are faced in California, with growing traffic congestion, increasing car and truck travel and aging road surfaces and bridges that will soon need significant repairs and rehabilitation.

As California's citizens look back on the many benefits that the Interstate Highway System has provided the state, they must also look ahead to meeting the challenge of providing a 21st Century Interstate Highway System that will continue to enhance the quality of life of today's and future residents of California.

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Endnotes

¹ California Department of Transportation (Caltrans): www.dot.ca.gov/interstate/CAinterstates.htm

² Ibid.

³ Ibid.

⁴ California would have had 24 Interstates, but I-480 through San Francisco was severely damaged by the Loma Prieta earthquake in 1991 and subsequently was torn down

⁵ Federal Highway Administration, "The Dwight D. Eisenhower National System of Interstate and Defense Highways," Interstate Facts.

⁶ U.S. Census Bureau data, Federal Highway Administration data. See charts MV-1 and VM-2. Additional historical data from Highway Statistics Summary to 1995.

⁷ TRIP analysis of Highway Statistics, 2004, Federal Highway Administration. Data is from charts VM-2 and HM-20.

⁸ Ibid.

⁹ Federal Highway Administration. TRIP analysis of Highway Statistics 2004.

¹⁰ Ibid.

¹¹ Texas Transportation Institute 2005 mobility study.

¹² Bureau of Transportation Statistics, U.S. Department of Transportation. 2002 Commodity Flow Survey, State Summaries. State Table 13.

¹³ Ibid.

¹⁴ Ibid., State Table 15.

¹⁵ TRIP analysis of 2004 Federal Highway Administration data. 2004 Highway Statistics. Chart VM-1.

¹⁶ Business, Transportation and Housing Agency and California Environmental Protection Agency. "Goods Movement Action Plan" p. IV-6, September 2005.

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- ¹⁷ Business, Transportation and Housing Agency, "Goods Movement Action Plan," Phase I: Foundations, page II-2, September 2005.
- ¹⁸ Ibid., p. IV-14.
- ¹⁹ Ibid., p. II-4.
- ²⁰ Highway Statistics 2004, Federal Highway Administration. Charts FI-10, VM-2.
- ²¹ Ibid.
- ²² TRIP analysis of 2004 Federal Highway Administration data. See charts HM-63 and HM-64 in Highway Statistics 2004.
- ²³ Ibid.
- ²⁴ Selecting a Preventative Maintenance Treatment for Flexible Pavements. R. Hicks, J. Moulthrop. Transportation Research Board. 1999. Figure 1.
- ²⁵ Federal Highway Administration, 2005. National Bridge Inventory data.
- ²⁶ Commonwealth of Pennsylvania. 2005-06 Governor's Executive Budget.
- ²⁷ TRIP analysis of Federal Highway Administration data. See 2004 Federal Highway Statistics, charts HM-60 and VM-2.
- ²⁸ Ibid., p. 7.
- ²⁹ TRIP calculation is based on TRIP analysis of 1997 to 2004 data. Estimates of lives saved by the Interstate system from 1956 to 1996 are based on analysis by Wendell Cox and Jean Love in the 1996 publication "The Best Investment a Nation Ever Made."
- ³⁰ TRIP analysis of National Highway Traffic Safety Administration and Federal Highway Administration data.
- ³¹ TRIP analysis of 2004 Federal Highway data, using speed factors from the 2005 Urban Mobility Report, which is published by the Texas Transportation Institute.
- ³² Ibid.
- ³³ The value of time used for these estimates was \$14.85 per hour, based on the value used by the Texas Transportation Institute in their annual report on urban traffic congestion.
- ³⁴ The U.S. Department of Labor estimates consumer costs per capita for U.S. regions. TRIP then calculated this data for each state by using state income per capita data to estimate cost differences between states.
- ³⁵ TRIP estimate based on FHWA data.
- ³⁶ Office of the Governor, "Strategic Growth Plan Briefing Packet," page 7, January 2006.
- ³⁷ Will Kempton, CTC and Caltrans Transportation Bond Workshop, June 27, 2006.
- ³⁸ Office of the Governor, "Go California," 2005, p. 12.
- ³⁹ Ibid., p. 15.
- ⁴⁰ John Haveman and David Hummels, "California's Global Gateways: Trends and Issues," Public Policy Institute of California, 2004, p. 78.
- ⁴¹ Will Kempton, CTC and Caltrans Transportation Bond Workshop, June 27, 2006.
- ⁴² "Traffic Congestion and Reliability: Trends and Advanced Strategies for Congestion Mitigation," Federal Highway Administration, November 2005.
- ⁴³ "How Far Has Congestion Spread?" 2005 Urban Mobility Study, Texas Transportation Institute.
- ⁴⁴ The California Transportation Commission's 2005 Annual Report delineates the complexity of funding and the difficulty in funding the current State Transportation Improvement Program (STIP). The 2005 Annual Report is available on the CTC website: <http://www.catc.ca.gov/>
- ⁴⁵ Will Kempton, CTC and Caltrans Transportation Bond Workshop, June 27, 2006.
- ⁴⁶ The report is on the Department of Finance Website: http://www.dof.ca.gov/HTML/CAPOUTLY/Infrastructure_Rept_06_w3.pdf
- ⁴⁷ 2005 Annual Report, California Transportation Commission.
- ⁴⁸ Joseph Tavaglione, Chair, California Transportation Commission, transmittal letter for CTC Annual Report, December 15, 2005.
- ⁴⁹ Annual Report to the Legislature, California Transportation Commission, December 2005.
- ⁵⁰ Caltrans, Office of External Affairs, June 2006.
- ⁵¹ Annual Report to the Legislature, California Transportation Commission, December 2005.