

ASCE CALIFORNIA



INFRASTRUCTURE REPORT CARD 2006



A Citizen's Guide

Table of Contents

Message from ASCE California.....	3
Introduction	5
Who Pays for Infrastructure?	6
Renewing California	7
Grading Our Public Works	7
Report Card	8
Understanding Infrastructure Issues.....	10
Aviation	12
Levees / Flood Control Systems	18
Parks and Open Space	24
Ports	30
Solid Waste.....	34
Transportation	39
Urban Runoff	44
Wastewater	49
Water	53
What You Can Do	58
Methodology	59
Glossary	61
Committee Memberships	63
Executive Committee	63
Infrastructure Working Committees	64
Expert Advisory Group	69
References	71
ASCE	72
APWA	73
CELSOC	74
UCI Civil & Environmental Engineering Affiliates.....	75
CIC	76



Message from ASCE California

Dear Friend:

This report card has been prepared by American Society of Civil Engineers (ASCE) in California. ASCE has over 12,000 members in both public and private sectors throughout the state. The support for this report card is founded in the engineering profession represented by not only ASCE, but organizations such as American Public Works Association (APWA), UC Irvine Civil & Environmental Engineering Affiliates (UCICEE), California Infrastructure Coalition (CIC), Consulting Engineers and Land Surveyors of California (CELSOC), and others, ... to name a few. **As the stewards of the infrastructure**, we have a moral duty to pass infrastructure capable of enhancing the health of the people and their economic livelihood to future generations. For far too long funding limitations have severely restricted the improvements so absolutely necessary for the continued upkeep of our infrastructure. Infrastructure maintenance and renewal is critical for sustaining the economic engine of California. This Infrastructure Report Card rates nine infrastructure categories and recommends public policy options and funding needed to rehabilitate and revitalize our infrastructure and to continue California's economic growth and overall quality of life that her residents have enjoyed.

This year, under the leadership of ASCE Region 9, which geographically consists of State of California, the process of developing a State-wide Infrastructure Report Card was initiated. California is one of the only states in the country to have well developed regional Infrastructure Report Cards. Utilizing these Report Cards as background material and drawing on the expertise of close to 100 volunteers from both the public and the private sector, the California Infrastructure Report Card (CAIRC) was born.

The result of our volunteers' hard work and dedication is the first ever Report Card on the state of our infrastructure, which was unveiled on Wednesday, September 27, 2006. Our work, however, is not done. Developing the Report Card was the first step in highlighting the importance of infrastructure maintenance. And as you will see in this report the grades are not all good. The total annual unfunded infrastructure investment required is \$37 billion. Much work needs to be done on the local and State-wide level to improve the grades.

In the mean time our task is to educate our public on the importance of infrastructure maintenance, encourage our colleagues in the public sector to continue the fight for infrastructure funding and maintenance, and to actively communicate to our elected officials the important role that infrastructure maintenance plays in our every day lives.

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Introduction

America's and California's Infrastructure - A Legacy in Peril

The magnificent Golden Gate and Brooklyn bridges; the Hoover, the Grand Coulee and other great dams and water systems of the west; our transcontinental railroads and unparalleled network of modern interstates; the airports, seaports, tunnels and transit systems that serve our cities -- all of these are part of California's infrastructure.

California in some respects is a microcosm of our nation. We are a culturally diverse, and rapidly growing State. As such, our infrastructure is beginning to show its age. With 35 million residents, California is the most populated state in the country and its economy ranks as the world's fifth largest economy. This trend is expected to continue into the foreseeable future. Over the next 20 years, California is expected to grow at a rapid pace. Based on some estimates our State will add an additional 10 million residents over the next 20 years, putting California's population at a staggering 45 million people.

A well-designed and maintained infrastructure anchors our economy and lifestyles and secures the public health and well-being. Investment in infrastructure is vital to our nation's productivity, competitiveness and economic well-being. Congestion on our highways alone costs the United States an estimated \$100 billion a year. Communities with efficient road systems, good schools and sewers can better attract residents and businesses. With updated water treatment plants, we can trust our tap water is safe. When traffic flows, goods and services move to market faster and more efficiently, lowering the cost to consumers. Modern school buildings provide a secure and healthy environment where our children can concentrate on learning. Efficient waste management programs reduce waste volume, and dispose of and contain waste effectively.

California's grades are slightly better than the nation as a whole. The National grade is a "D". California received an overall grade of C-. This grade is understandable since up until 30 years ago infrastructure investment made up 20% of the State's annual budget. Even so, we see elements of our infrastructure in the older parts of the State operating well past the design life and needing upgrading or replacement. In other parts of the State, infrastructure elements are 40 plus years old, and will soon need significant upgrading. It is essential that we respond now to prevent a California infrastructure meltdown.

Who Pays for Infrastructure?

Our public works are public assets. We all have a stake in their upkeep and operation, and we all share in the expense of construction and maintenance.

Sometimes, infrastructure is paid for by those who actually use it most, through tolls, utility bills or special taxes on gas, airline tickets and other items. But because infrastructure improvements affect us all by supporting our economy and providing fundamental community services, a portion of the cost is usually borne by the public through general tax revenues.

For years, the federal government has played a large role in collecting and distributing funds for infrastructure improvements. Increasingly, however, this responsibility is being turned over to state and local governments, who may finance infrastructure projects through bonds, sales taxes or general tax revenues. This places responsibility for infrastructure renewal and development squarely with individual voters, who must approve bond issues and elect political leaders who will make addressing our infrastructure needs a priority.

In the past 40 years, our capital investment has plummeted precipitously. In the 1950s and 60s, California spent 20 cents of every dollar on capital projects. By the 1980 that figure dropped to less than five cents on the dollar. Current estimates put infrastructure investment at around a penny on the dollar. This despite ever-increasing demands presented by population growth and economic development. Much of the state's public infrastructure was designed and built to serve a population half the size of California's 35 million residents. And the state is still growing strong.

Renewing California

In January 1848, gold was discovered at Sutter’s Mill in the Sierra Nevada foothills about 40 miles east of Sacramento beginning the California Gold Rush, which had the most extensive impact on population growth of the state of any era. The Gold Rush brought the world to California. California was given official statehood by Congress on September 9, 1850 as part of the Compromise of 1850. By 1855, some 300,000 “Forty-Niners” had arrived from every continent. California has continued to grow and thrive into the 21st Century making it the most populous State in the Union. California’s infrastructure like the State itself is showing its age.

Over 35 million people rely upon these systems every day and their dependability and quality are silent, but significant contributors to our economic prosperity and quality of life. The Citizen’s Guide is designed first to engage California’s leaders and then the citizenry at large in a call to action for continued, strong investment in our State’s infrastructure. Never in our State’s history has this been more important: California stands poised on the brink of tremendous growth. Now is the time to protect our past investments and to plan for our infrastructure future. This guide will help us identify the most pressing needs facing our State’s infrastructure systems. We invite you to join a growing list of concerned citizens making the case for renewing California.

Grading Our Public Works

The working groups and their Expert Advisory Groups (EAG) assigned letter grades to the nine main categories of California public infrastructure reviewed this year. The average grade is “C-”. The Report Card, reprinted on pages 6 and 7, shows how California’s roads, bridges, water and sewer systems measure up.

ASCE CALIFORNIA INFRASTRUCTURE REPORT CARD 2006	
www.ascecareportcard.org	
Aviation	C-
Levees / Flood Control	F
Parks / Open Space	D+
Ports	C+
Solid Waste	B
Transportation	D+
Urban Runoff	D+
Wastewater	C+
Water	C+
California's Infrastructure GPA	C-
Annual Investment Needs	\$37 Billion

C-

Aviation

The State of California is experiencing massive growth with a projected population in excess of 40,000,000 by the year 2030. Significant actions must be taken to meet the anticipated demand requirements for air transportation, particularly commercial, foreign and domestic travel, and air cargo and to maintain the significant economic development provided by this industry. This demand is a result of consistent growth within the state as well as limited capacity and increasing restrictions on aviation infrastructure growth within regions. California must ensure efficient air travel and cargo transport by expanding airports and building regional airports to distribute the influx of passengers and cargo or risk losing its competitive edge. Annual investment needed to achieve a B Grade is \$0.5 billion.

F

Levees/Flood Control

There is a real potential for catastrophic disaster to life and property in California. This is due to the fragile condition of our Levee system. These fragile levee systems protect thousands of homes and billions of dollars in critical infrastructure. Annual investment of \$4.2 Billion is necessary to reduce the impacts of potential catastrophic failure.

D+

Parks & Open Spaces

California's growing population, which is expected to increase by 25 million people by 2040, is considerably increasing demands on our parks, natural forests, and beaches. Inadequate planning and funding has resulted in significant degradation of parks and facilities. Important natural resource lands are lost for lack of acquisition and maintenance funding. Since 2002, the conditions and funding have become steadily worse. The State is currently suffering from widespread traffic congestion, air pollution, overcrowded and aging parks, lack of park accessibility, and rapidly degrading ecosystems. An investment of approximately \$15 billion over the next 10 years, or an annual investment of \$1.5 billion would be necessary to bring the Parks and Open Space grade up to a "B."

C+

Ports

The California Ports and their infrastructure provide a vital link and play an important role in the movement and supply of our nation's goods and materials. The overall infrastructure is in good shape today, but projected cargo will double by 2010. To maintain current levels, the regular assessment and upgrade of the infrastructure is vital to facilitate the cargo exchange from water to land via rail or truck and vice versa. Annual Investment of \$1.2 billion is required.

B

Solid Waste

Solid Waste systems are operated by a combination of private (collection and transfer) and County (landfills) facilities. Modern recycling has resulted in a 50% reduction in solid waste delivered to its landfills. Advanced planning is underway

to extend landfill capacity through the year 2045. No increase in annual investment is required as long as current funding levels of \$5.0 billion are maintained.

D+

Transportation

Highways, local roadways, and bridges are some of California's most valuable assets. California is home to some of the most recognizable bridges in the nation and the world. Additionally the State's mass transportation systems and transit systems are multi-modal systems that provide alternatives to private cars. The overall grade of D+ reflects concerns about capacity despite investment in seismic upgrades, and on-going maintenance. Significant investment, estimated at 17.9 billion dollars annually, is needed to raise our Transportation infrastructure's grade to a "B" Grade.

D+

Urban Runoff

Urban runoff is an environmental challenge facing all Californians. Water quality problems impact our daily enjoyment of life. Going to the beach isn't what it used to be. Californians are impacted by beach postings and closures. Not only do we need infrastructure to clean our waterways but we also need to change our old habits. All of this requires time, money, education and the willingness to improve our environment. Californians need watershed-based, multi-purpose and multi-agency solutions to address the urban runoff problem along with a dedicated funding source for urban runoff. Annual investment of \$5.5 billion is needed to improve the grade for urban runoff to a "B".

C+

Wastewater

California's 100,000 miles of sewers and 200 wastewater treatment plants generally perform adequately to protect the water resources of the State by managing the 4 billion gallons of wastewater generated every day by California's citizens and businesses. Nevertheless, the condition and performance of California wastewater infrastructure (sewers, treatment plants and effluent disposal) are quite variable. Age of systems, topography, ongoing investment in new capacity, upgrades and rehabilitation and rainfall-related flows contribute to this variability. The annual required capital investment in wastewater infrastructure, statewide, is \$2.3 billion. Recently adopted State-Wide Waste Discharge Requirements operating requirements for sanitary sewers should result in improved statewide performance. However, this will require long-term local commitments for equipment, rehabilitation projects, and staff in all parts of California.

C+

Water

Significant investments are needed to address renewal and replacement, maintenance, security and reliability funding for the State's water infrastructure. These investments will increase sustainability and will ensure water supply and infrastructure reliability into the future. The annual investment needed to raise our Water infrastructure grade to a "B" is \$4 billion.

Understanding Infrastructure Issues

Now that you have seen California's infrastructure report card, you may be asking how you can help improve our State's infrastructure. Our suggestions are the same as given in the ASCE National Report Card:

Infrastructure is a complex network of public works, which includes roads, bridges, airports, dams, school facilities, and utilities. The rules governing its planning, financing, construction, and upkeep are equally complex. Whether your goal is to shorten your daily commute, attract new business to your community, or protect the environment for your children, gaining a better understanding of these issues is the first step toward becoming an advocate for infrastructure renewal in your community.

As you read through this Citizen's Guide, think about the following:

Be an informed citizen.

In order to educate public officials about infrastructure needs in your community, you must understand what those needs are. Consider the Infrastructure Report Card. How does your community measure up?

Demand continuous and timely maintenance.

If transportation, water, and other infrastructure facilities are not kept in sound condition, they cannot support the level of service they are designed to handle. Regular maintenance prolongs use and minimizes the need for costly repairs. The money saved can be used to fund other community priorities. Unfortunately, policies often encourage new construction at the expense of maintenance.

Think long-term.

Renewing America's infrastructure is an ambitious goal. It cannot be achieved overnight. Furthermore, the roads, bridges, water treatment plants, and other facilities built today must serve for decades to come. Comprehensive planning and long-term investment are key to sound decisions about infrastructure.

Consider all the factors influencing infrastructure decisions.

Building a new highway has implications beyond the immediate highway corridor. For example, concern that a new highway may displace wetlands must be balanced against the reduction in air pollution that will result from decreased traffic congestion.

Do more with less.

Clearly, money alone will not solve our infrastructure problems. Solutions to urban problems such as traffic congestion and contaminated water require new technologies and approaches. Research can help identify more efficient designs and longer lasting, maintenance-free materials. And, we can change our behavior-through recycling, telecommuting, or using mass transit, for example-to reduce the demand on our infrastructure.

Preserve the environment.

To use the nation's resources most effectively, we must balance environmental and economic goals. Land use and transportation patterns designed to foster economic growth and personal mobility can be developed in harmony with environmental benefits.

Look at the big picture.

Remember that beyond the immediate, individual benefits you gain from infrastructure improvements, there are broader community benefits. For example, even though you may not use the new mass transit system, its construction will reduce traffic congestion on local roads and increase nearby property values.

Aviation

Commercial aviation facilities in California are facing a crisis in meeting future capacity needs tied to future passenger and cargo demands over the next 25 years. With the population of California expected to approach 40,000,000 persons by 2030, aviation facilities, comprised of major international and regional airports serving the State, must be upgraded. This evaluation reviewed 11 of the Primary/Commercial Service airports in the State which serve over 1 Million Annual Passengers (MAP). These are:

CALIFORNIA

San Francisco International - SFO

Oakland International – OAK

Mineta San Jose International – SJO

Sacramento International – SMF

Los Angeles International – LAX

Bob Hope Burbank - BUR

Long Beach Municipal – LGB

Orange County John Wayne – SNA

Ontario International – ONT

Palm Springs International – PSP

San Diego International - SAN

A variety of measures were used to evaluate current infrastructure of these airports. The infrastructure grades for the 2005 ASCE Regional Infrastructure Report Cards were taken into consideration. These were:

Inland Empire A+

Orange County B+

Bay Area C-

The Los Angeles and San Diego Regional Report Cards did not include the Aviation category in their 2005 Infrastructure Report Cards. The Sacramento Regional Report Card did not evaluate Aviation in their 2006 Report Card. The 2005 ASCE National Infrastructure Report Card was also referenced. The 2005 national grade for Aviation was D+.

To evaluate the impact of current demand on existing infrastructure, gate utilization and runway utilization were evaluated and compared to the annual Runway Incursion rate at each airport, as reported by the FAA for 2003. The FAA defines a runway incursion as any occurrence at an

airport involving an aircraft, vehicle, person, or object on the ground that creates a collision hazard or results in loss of separation with an aircraft taking off, intending to take off, landing, or intending to land. A Runway Incursion Rate is measured by incidents per 100,000 flights.

California airports were also evaluated for the ability to meet future aviation service needs. Given that airport expansion planning can take up to 10 years to complete, and that community opposition often thwarts the implementation of approved Master Plans, it is clear that airports must begin addressing their infrastructure needs long before demand outstrips available capacity. While most airports are in some phase of expansion or renovation, in recent years many have been thwarted in their efforts to increase capacity enough to fully address future aviation demand. Furthermore, few have had back-up plans to secure additional capacity through other airports or other transportation solutions.

The following are brief overviews of operations at the four largest airports in California.

Northern California

San Francisco International Airport – Bay Area Region

San Francisco International Airport (SFO), located 13 miles south of San Francisco, is the largest airport in the Bay Area. With eighty-eight (88) gates and four (4) runways, SFO served 33.4 MAP in 2005, making it the thirteenth largest passenger airport in the United States and the twenty-second largest passenger airport in the world. Flight operation in 2005 amounted to 352,871 or approximately 967 per day. In 2003, runway incursions amounted to 3 for an average incursion rate of about 0.85. Current operating revenues at the SFO facility are \$486 million annually.

While SFO has focused on upgrading its airport facilities, it still has one of the worst flight delay records of any major US airport. Approximately once a week, SFO's average flight delay is 40 minutes or greater. SFO's current parallel runways are located too close together to allow simultaneous aircraft landings during bad weather. Normally able to process 60 arrivals per hour, on bad weather days only one of the four runways can be used at a time, permitting only 30 arrivals per hour.

To address this problem, SFO began a Runway Modernization Program to redesign the runway layout to address aircraft flight delays and noise impacts as well as to accommodate the larger aircraft such as the A380. However, SFO has put the program on hold because of opposition

from environmental groups concerned about significant impacts to sensitive animal habitat and Bay water quality. So while SFO's ongoing infrastructure investment may ultimately yield greater passenger comfort and easier airport access, as long as the runways remain in their current configuration San Francisco International Airport will continue to experience significant flight delays and cancellations that ultimately affect the entire air transportation system. Furthermore, without modernizing the runway layout, SFO will not be able to meet its future aviation demand, forecasted to almost double to 60 MAP by 2020.

Oakland International Airport – Bay Area Region

Metropolitan Oakland International Airport (OAK), owned by the Port of Oakland, is located four miles south of downtown Oakland in Alameda County. Acting as a reliever airport for SFO, Oakland International is one of the nation's fastest growing airports. Currently servicing 14.4 MAP, OAK has two terminals, 24 aircraft gates (with an additional five under construction), one main runway used for all commercial aircraft, and three shorter runways used for general aviation flights. Located on 2,900 acres, the total number of flight operations in 2005 was 334,544 or an average of approximately 916 per day. OAK had no runway incursions in 2004. Annual operating revenues for OAK were \$246 million.

A terminal improvement program is currently underway which will renovate one terminal by adding a five-gate concourse, expanded ticketing, security and baggage claim facilities, and a modern, centralized food and retail area. Roadway and curbsides improvements will facilitate access and ease traffic congestion in front of the terminals. One completed, the second terminal will be renovated and expanded by seven gates. OAK is also in the advanced planning stages for an automated rail connection from the airport to the nearby BART station, due to be completed around 2011. While the transit mode has yet to be determined, it will be fully integrated into the BART system.

As with the other Bay Area airports, Oakland will see a significant increase in aviation demand over the next twenty years. Future passenger activity is expected to double to 30 MAP by 2025. To address this, OAK began a new airport master planning process in 2004 to identify near-term airport modernization projects (5-year timeframe) and long-term (20-year) general land-use guidelines. So while OAK is expanding its infrastructure to address increased demand, it will still have a capacity shortfall in 2025.

Northern California's Aviation Future

For Northern California, San Francisco International Airport will most likely remain the primary airport, but without significant growth. Oakland International Airport and San Jose International Airport will continue to grow for the time being, but ultimately, these other airports will have their growth restricted by limited runway capacity. Neither Oakland nor San Jose have plans for additional runways. With SFO's Runway Modernization Program on hold, there seems to be no solution in sight for the significant flight delays experienced in this region. Currently, the three Bay Area airports combined do not have sufficient capacity on bad weather days to meet the region's air traffic demand. Within 10 years, these three airports combined will not have sufficient capacity to meet regional air traffic demand even on good weather days.

Southern California

Los Angeles International Airport – Los Angeles Region

Los Angeles International Airport (LAX), operated by Los Angeles World Airports (LAWA), is located 15 miles southwest of downtown Los Angeles, immediately adjacent to El Segundo. Ranked as the third busiest airport in the United States and the fifth busiest in the world, LAX served 65 MAP and processed more than 2 million tons of cargo in 2005. The airport sits on 3,425 acres and has nine terminals, 163 gates, and four runways. Total annual flight operations in 2005 were 650,629 or approximately 1,782 per day. Runway incursions in 2004 were 4, for an incursion rate of 1.08. Annual operating revenues at LAX were \$615.1 million.

In the mid-1990s, LAWA began a master planning process to modernize LAX, only to be stymied by fierce opposition from a community coalition of neighboring cities. In late 2005, newly elected Los Angeles Mayor Antonio Villaraigosa negotiated a settlement with opposing communities that permits key airport projects that improve security and safety to move forward. The settlement agreement also reduces the number of operating gates and replaces key projects that would increase capacity with alternative projects that increase efficiency and safety without increasing airport capacity. This Agreement will essentially limit LAX to 78 MAP through 2020. The City of Los Angeles also agreed to spearhead a regional planning effort with the goal to redistribute aviation service to outlying airports. Reaching agreement with the surrounding communities has allowed LAX to move forward with infrastructure improvements that address key operational issues.

San Diego International Airport – San Diego Region

San Diego International Airport (SAN), also known as Lindberg Field, is operated by the San Diego County Regional Airport Authority (SDCRAA). San Diego International Airport is the busiest single-runway commercial airport in the nation. It is also one of the physically smallest, occupying only 661 acres of land. With only one (1) runway, San Diego has the highest runway utilization factor of any California airport.

SAN currently serves 17.4 MAP through forty-five (45) gates. Forecasted capacity requirements for 2030 are 33 MAP. Flight operations in 2005 amounted to 220,210 or approximately 603 per day. In 2004 runway incursions amounted to 2 for an average incursion rate of 0.47. Current operating revenues at the SDO facility are \$108.1 million annually.

While the Airport Authority is beginning upon a major renovation this year, including a ten (10) gate terminal expansion, airfield paving improvements and new parking structure, SDCRAA's main focus has been identifying a site for a new airport that can accommodate the projected growth for the next 20 years.

Southern California's Aviation Future

Southern California has seen the demise of two major airport projects; namely the reuse of El Toro Marine Corps Air Station as a commercial airport and the expansion of LAX to address future growth in aviation demand. Both began the airport master planning process, as required by Federal law, only to be stopped by community opposition fearing more flight operations and more environmental impacts to their quality of life. And while many opponents of these projects pointed to other outlying airports to capture the burgeoning aviation market, until recently very little was done to develop a system that would move the aviation market from the airports located in the coastal counties to the inland airports.

In early 2006, Los Angeles Mayor Antonio Villaraigosa negotiated a settlement agreement on the modernization of LAX, committing to resolve the aviation challenges the Los Angeles basin is facing with a formal process to move the aviation market from airports in the coastal counties to inland airports that have excess capacity. He immediately began this process by implementing a shuttle service between downtown Los Angeles into LAX to address the increasing ground traffic congestion in the host communities around LAX. He also called for the reactivation of the Southern California Regional Airport Authority (SCRAA), a joint powers authority created to implement a regional aviation system for Southern California. Comprised of the counties of Los Angeles and

San Bernardino and the City of Los Angeles, the SCRAA goal was to implement a decentralized aviation system.



Public Policy Considerations

- Continue annual operational and capital investment at current levels or higher
- Seek full funding for the California Airport Improvement Program (AIP)
- Continue to fund security upgrades at all facilities
- Develop strategies to integrate high speed rail linkage to international and regional airports
- Implement environmental streamlining
- Modernize air traffic control systems

Security

California's airports are working in concert with the Department of Homeland Security (DHS) and the Transportation Security Administration (TSA) and were found to be in compliance with federal security requirements. As an example, TSA Standardized Security Screening Procedures were applied across the board to all airports. Additional improvements were found to be in place in several airports. For example, Explosive Detection Systems, such as those recently installed at John Wayne Airport in Orange County, enhance airport security and allow passengers to move through the airport and board aircraft with virtually no delays.

Infrastructure Funding

Capital investment needs are estimated to average about \$0.5 Billion annually in California over the next five years, totaling \$2.5 Billion. Funding through Federal, State, regional, local sources as well as passenger and cargo based fees are the primary sources of revenue. Nationwide sources for funding in 2005 included: Airport Bonds (59%), Airport Improvement Program (AIP) Grants (21%), Passenger Facility Charges (13%), State and Local Funding (4%) and Airport Revenues (4%).

Levees/Flood Control Systems

Levees and other flood risk reduction structures have only recently been in the government's focus to be brought up to acceptable standards. There is much to be done to bring this element of the State's infrastructure to a level that citizens expect and experts agree would be beneficial. Levees do not eliminate risk and can create, especially in cases where there is an inadequate level of protection for large urban developments, a significant and potentially catastrophic residual risk that may be increasing as conditions in a region change. The current status of this element of the State's infrastructure is unacceptable at any level of analysis.

Because of the very real probability for a catastrophic flood disaster to life and property, a grade of F has been issued to the levees and levee systems in the state of California. This was done because leading experts agree that the levee systems in California are fragile and subject to failure from a number of failure modes. These fragile levee systems protect thousands of homes and billions of dollars in critical infrastructure, which hasn't been built in consideration of the residual flood risk. A failure of any one of the urban levee systems carries with it the probability for loss of life, and at a minimum would cost hundreds of millions of dollars to repair damages. A catastrophic failure of one of the levee systems carries with it the very real potential to be a mega-disaster greater than Hurricane Katrina.

Levee Deterioration

For the past decade, the U.S. Army Corps of Engineers has been warning policy makers about the deteriorating levee conditions. On February 24, 2006, Governor Schwarzenegger agreed and proclaimed a State of Emergency for the California levee system. This extraordinary action was prompted by a report by the U.S. Army Corps of Engineers, completed in cooperation with the California Department of Water Resources. This report highlighted 29 critical erosion sites on levees within the Central Valley that had been identified for years as needing repairs. On February 26, 2006, Governor Schwarzenegger took the additional unprecedented step of asking President Bush to declare a pre-disaster Federal State of Emergency so that Federal dollars could be immediately allocated for the repairs.

Earthquake Hazards

The California Department of Water Resources completed a study last year that simulated the potential effects of a plausible magnitude 6.5 earthquake along the perimeter of the Delta. A 6.5 earthquake has a probability of

occurring roughly equal to that of the 1% annual chance flood event. The study concluded that such an earthquake would likely cause catastrophic levee failure and would result in extensive damages. By allowing salt water from San Francisco Bay to stream into the Delta, a catastrophic levee failure would jeopardize the drinking water for more than 20 million people in the state and contaminate irrigation water sources for over three million acres of our most productive agricultural land. Levee failure would halt transportation and farm activities for months. The estimated short-term agricultural economic damage is projected to include the loss of 30,000 jobs and \$30 billion to \$40 billion in revenue and assets. In the long term, some of the levees would never be repaired, their protected areas reverting to inland lakes. We agree with the assessment and note that such projections assume that the failures of emergency response which occurred in New Orleans do not occur if the levees fail in the Sacramento or Delta areas. Without excellent emergency response, the losses from catastrophic levee failure could be even greater.

Loss of Critical Infrastructure Systems

The Sacramento-San Joaquin River systems in the Central Valley are threaded with a fragile network of earthen levees. These earthen levees, originally built from dredged river material by farmers working without engineering designs or supervision, now form a system that protects the water supply of 23 million Californians, the homes and businesses of more than 500,000 people, the irrigation systems of more than three million acres of productive agricultural land, and lifeline transportation and utility corridors. These levees are subject to subsidence, seepage, erosion, and encroachment from old and new development. When major levee failures occur, homes, farms, roads, rail, energy pipelines and power lines will be flooded and water supplies and farmland will be contaminated by salt water. This contamination would impair the productivity of some of the most farm land in the United States for generations.

Failure to Meet Certification Standards

Of the 1,600 miles of levees in the Sacramento-San Joaquin river system, 385 miles are project levees, which are levees that were improved and incorporated into the Sacramento and San Joaquin Flood Control Projects. Of these 385 miles, only 23 miles have recently been certified by the Corps as meeting the minimum flood hazard mapping standards for providing protection from a 1% annual chance flood event (or 100 year flood protection). In other words, over 98% of the levees in the system are not certified to meet minimum National Flood Insurance Program (NFIP) standards for 100 year flood protection and experts agree that this standard is too low for urban areas.

Statewide Levee Challenges California's levee system problems are not confined to the Central Valley. All along the Southern California coast, in San Luis Obispo, Santa Barbara, Riverside, San Bernardino, Orange and Los Angeles Counties, earthen levees reduce flood risk to the homes and businesses of hundreds of thousands of Californians. Less than 10% of these levees currently meet NFIP certification criteria for providing flood protection from the 1% annual chance flood event.

Questions for Policymakers

The challenges with developing and maintaining levee systems and the realization that they don't protect from the largest floods have served to underscore the need for more workable floodplain management strategies. Attention to land use and building requirements for new construction has often been secondary to levees and dams, but as the cost for improving California's flood control plan increases, will the State and Federal government accept this burden? Or will citizens build outside the floodplain or be required to elevate above flood levels, thus increasing the homeowner's cost? These policy decisions are based on choices that require society to weigh competing values. Regardless, evaluating the problem of flood losses and providing for the need to safeguard human life requires immediate attention to California's levee systems and policy discussions on where and how to develop in the future.

Sacramento, the Capital City at Risk

Like many American cities, Sacramento lies at the confluence of two major rivers. Old Sacramento, where the town began, is a tourist area that lies in the shadow of the Sacramento River levee, but ironically at higher ground than neighboring development. Today, the City of Sacramento has about a 100-year level of protection, much lower than New Orleans proper before hurricane Katrina. Most river cities of comparable size seek protection at the 300- to 500-year level.

According to the Sacramento Area Flood Control Agency, a major flood in Sacramento would spread for miles and run as deep as rooflines in some places. Although drainage of these areas would be quicker than was the case in New Orleans, the damage would be similar. More than 300,000 people and 140,000 structures are in the direct path of a serious flood in Sacramento.

Although ASCE gives a grade of F to the overall state of governance with respect to managing the states flood threat and losses, and a grade of D to the levee system itself, there are a number of a success stories.

In January 2005, the City of San Jose, in partnership with the Santa Clara Valley Water District and the Corps of Engineers, celebrated the completion

of a \$251 million flood control project that now protects downtown San Jose from the 1% annual chance flood event. It was designed in conjunction with San Jose's signature downtown urban park, which was completed in September 2005. Although the project was completed more than 30 years after it was first proposed, for the first time, the unofficial capital of Silicon Valley, and the third largest City in California, has at least the minimum level of protection typical for significant metropolitan areas.

In the County of Napa, the Napa River-Napa Creek Flood Protection Project is well underway. This project, which was made possible by the passage of Napa County Measure A in March 1998, is scheduled to be completed in 2009. The award winning Living Rivers Plan was developed by an unprecedented countywide coalition of political and community leaders, private industry, natural resource agencies, non-profit groups, and private citizens. The innovative plan provides flood protection in part by reconnecting the Napa River to its historical floodplain and by restoring over 600 acres of tidal wetlands.

Funding is desperately needed to fix the deficiencies in our overall flood control system. However, money alone will not fix the crisis. Flood management in California needs an approach that will achieve both short-term and long-term sustainable solutions. This approach should address the underlying issues that led to the emergency we now face and must involve policy and legislative changes, program reforms and funding proposals to better protect California from the devastating consequences and economic impacts caused by floods. In January 2005, Department of Water Resources issued a white paper about this topic titled, *Flood Warnings: Responding to California's Flood Crisis*. The recommendations included:

1. Ensure the integrity of existing flood project infrastructure through improved maintenance programs that balance public safety and environmental protection.
2. Evaluate the integrity of existing flood control project facilities and prepare an economically viable rehabilitation plan.
3. Improve the effectiveness of emergency response programs.
4. Create a sustainable fund to support flood management programs.
5. Update floodplain maps and provide better education on flood risks to the public and to agencies that authorize development in floodplains.
6. Where feasible, implement a multi-objective management approach for floodplains that would include, but not be limited to, increased flood protection, ecosystem restoration, and farmland protection.

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7. Evaluate potential policies and procedures that may determine the State's capacity to fund levee maintenance, infrastructure improvements and emergency response in the Delta.

Time, gravity, normal erosion, and watershed changes gradually diminish the level of protection levees were designed to provide. In addition, as discussed above, many of the levees were initially not designed at all; instead they were built as needed by farmers and others with the equipment and knowledge available on hand at the time. FEMA and other emergency preparedness agencies and, most importantly, the public must be notified promptly when the protection of the levee systems is found to be below acceptable safety levels. We also recommend that levees that are recognized as providing protection from major flood events be re-certified regularly to confirm that they provide that protection. Results of these regular reviews should be widely publicized. Lastly, because no levee system however well maintained can hold the largest flood, we need to ensure that up-to-date flood warning and preparedness plans focused on public safety, exist for all floodplains behind levees, and that flood insurance should be purchased by owners of all home and businesses behind levees to reduce the financial devastation flood losses impart.



Public Policy Considerations

Regional, watershed-based integrated planning and funding efforts continue to be the policy direction that is needed to improve our flood management, water quality and ecosystem goals throughout the State. Although progress has been made in this direction, the State, counties, cities and other local special districts must continue to make this a top priority. An adequate, equitable and dedicated funding source for watershed-based programs is needed that would fund not only capital programs but also operations and maintenance. Currently, levees and flood modification efforts are not directly funded throughout the State. A dedicated funding source would provide a higher-level autonomy while promoting a more regional cross-jurisdictional approach.

The following are some specific options and recommendations for achieving a coherent and comprehensive Flood Control Systems / Levee program:

Regional Planning

- Develop and implement multiple objective management approach for flood control systems that includes increased flood protection, ecosystem restoration, and water quality objectives

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- Develop and implement watershed-based flood control /levee programs that can integrate the multiple objectives above.
 - Develop an adequate, equitable, and dedicated funding source for these watershed-based programs that would fund both capital construction projects, and operations and maintenance.
 - Develop a framework agreement with resource protection agencies to allow critical maintenance to implement agreed-upon mitigation measures and to provide a process for developing long-term maintenance solutions that accommodate environmental values that are compatible with flood control system functionality
 - Develop a plan to recover subventions (contributions from the State of California that amount to 70 percent of the local match for Federal projects). This funding shortfall from the State is critically hampering all local flood control agencies from having sufficient revenue to implement infrastructure improvement.

Security

Levees need to be protected. These components of the infrastructure are located on government owned land as well as privately owned land. Currently the typical security measures utilized are fences without controlled access. Other major infrastructure facilities are already receiving heightened security measures but many levees at critical locations are lacking any security measures.

Infrastructure Funding

In June 2004 near Sacramento, California, a single breach of the Upper Jones Tract levee resulted in a federal disaster declaration and \$90 million in damage. It took six months to repair the breach and drain the area. To bring Levees/Flood Control System up to a “B” Grade, \$42.4 Billion must be spent over the next 10 years to improve/replace 1,600 miles of California levees/flood control facilities. This translates to an annual investment of \$4.2 billion per year.

Parks and Open Space

Infrastructure is more than just concrete, and serves more than just commerce. According to the “Ten Point Statement of Principles” regarding the need for an infrastructure bond, “parks, trails, coastal rivers and resources, and other protected lands and waters are an essential part of California’s public infrastructure.” The parks and open space infrastructure category encompasses parks in general, recreational fields and trails, walk able communities, and master planned mixed-use developments that encourage walking and minimize the use of the private automobile for making trips. This infrastructure category involves two infrastructure sub-categories, (1) parks and (2) open space. Each one has a distinct definition according to the State of California. The parks sub-category would include any developed area for community development and recreation purposes. This sub-category would consist of grasslands, playgrounds, central plazas, recreation fields, recreation trails and related facilities, beaches, boat launching facilities, parking lots serving the park, pocket parks, and other related facilities which are developed. The open space sub-category consists of undeveloped land which is set aside for the purpose of preserving natural resources. The distinction between these two sub-categories is that parks are developed whereas open space is undeveloped.

Evaluation Criteria

The purpose of parks is to provide space for seclusion and recreation of the public, as well as preserving and enhancing the environment. Parks and open space may also provide additional functions including drainage, ecosystem enhancement, and water quality improvement functions. The parks category extends far beyond the traditional “green infrastructure” or grassland recreation area that we normally associate with parks. A commitment to walk able communities may include recreational trails, wilderness preserves, pocket parks interspersed through residential areas, and finally mixed-use developments which incorporate numerous land uses such as residential, recreational, commercial, and shopping within a single property or development.

The categories that the parks committee used as a basis for its evaluation include the following:

1. Accessibility: What percent of children have access to a park within walking distance?
2. Quality: What is the overall quality of the park in terms of maintenance/upkeep, cleanliness, variety of activities available

(recreation fields, tennis courts, basketball courts, skateboard parks, playgrounds, wilderness preserves, wetland preservation, etc.)? How clean and attractive are the play areas? Are they overrun with trash, glass, and debris, or are they clean and encourage extensive use? Is the playground equipment clean, safe and free of graffiti? Is the area primarily characterized by grassland or pavement and concrete?

3. Capacity: How sufficient are facilities to accommodate demand? Such facilities may include the quantity and accessibility of parking spaces, restroom facilities, drinking and other concession facilities, recreation fields, sports courts, boat launching facilities, camp sites, etc.
4. Environmental Stewardship: To what extent do the facilities represent a commitment to preserve the environment? Supplemental considerations may include the following:
 - a. Is the area built around a wetland or will it be creating wetlands?
 - b. Does the park have trees, ecological walls, ponds, wildlife preserves, waterfalls, and other features to produce a secluded environment with appropriate noise abatement measures? Is the park built around an undeveloped area to preserve the environment?
 - c. What's the condition of the surrounding community ecosystem? What historic trends are characteristic of the surrounding ecosystem? How will the park enhance or detract from this surrounding ecosystem?
 - d. How well does the park fit into the surrounding environment? Does it contrast sharply with the surrounding environment or does it blend in to it?
 - e. Does the overall community contain multiple uses such as residential, commercial, educational, industrial, and retail uses within walking distance to encourage trips by modes other than by polluting carrying units such as buses and private automobiles?
5. Commitment to the health and well-being of the end users: Does the park area provide convenient bicycle and pedestrian paths that are physically separated from the roadways and within close proximity to the residents? Are the walking areas well illuminated to enhance nighttime visibility and ensure safety? Do the areas reflect an overall environment that encourages recreation and leisure activities? Are there adequate restrooms, drinking facilities, concessions, and benches along these recreation trails? Do all of the residents live within one half mile of a playground, trailhead, or recreation field?

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6. Commitment to diverse land use planning: Does the surrounding community have parks and recreation facilities interspersed among residential, retail, commercial, and industrial opportunities? How many acres per thousand residents are set aside for park areas? Does this vary among the affluent and impoverished communities?
 7. To what extent does the park planning make use of innovative concepts such as freeway park planning, rooftop parks and terraces, and cascading waterfalls?
 8. To what extent does the park capitalize on the surrounding natural beauty of the community? Are boulevards planned with clear orientations that incorporate mountain ranges and waterfalls among the visual resources? If the community contains waterfront land, is the majority of this land set aside for park and recreational uses or is it characterized by commercial, industrial uses, and privately owned land?

The parks and open space evaluation is a “holistic” grading based on numerous factors including cleanliness, variety of uses, accessibility, capacity, and land use among others.

Findings

1. There is a huge park service disparity among the affluent vs. impoverished areas of the State. The affluent areas are characterized by clean, and well-maintained parks. The impoverished areas are characterized by scarce, poorly maintained parks.
2. From an urban land planning standpoint, there is a wide range of park and open space density coverage. At the high end, cities such as Roseville have approximately 9 acres of park and open space per 1,000 residents. Portions of Los Angeles have less than 1 acre of park and open space per 1,000 residents. Approximately two-thirds of children living in Los Angeles are not within walking distance of a park. For those few that are fortunate enough to be within park walking distance, the parks are typically characterized by widespread concrete or asphalt are littered, and defaced by graffiti.
3. California’s ecosystems are rapidly declining. San Diego for example has lost most of its wetlands and estuaries. Specifically, the region has lost 27,000 acres of farmland to urban uses, and it has lost 95% of its perennial grasslands and 90% of its freshwater marshes. There’s a huge need for investing in wetland restoration and preserving the environment in order to ensure that the next generation has adequate

access to natural resources. San Diego County has more endangered species than any other county in the United States.

4. California's population continues to increase, yet park areas are vastly overcrowded and failing to keep up with the demand. The rapidly growing central valley is one area that is considerably underserved.
5. There has been an increase in population and a drop in investment between 2002 and 2006, therefore the 2006 standards are definitely unmet.
6. From a land use standpoint, our urban and suburban areas are primarily characterized by strip malls along arterial streets that require numerous vehicle trips when traveling from one location to the next. While there are a few parts of the State, such as certain Sonoma County cities, that have a plaza focus, these are very few and far between. It's definitely time to rethink how we plan our communities such that mixed-use plaza-oriented developments which minimize vehicle trips become the norm, not the exception.
7. There is a tremendous need for upgrading or replacing existing boating facilities. According to the California Department of Boating and Waterways, approximately 67% of our State's boating facilities are in need of repair and replacement work. The Federal, State, and local funding allocated for these repair and replacement expenditures fall far short of the need.
8. Many and large areas in California are characterized by fragile ecosystems which are continuing to be threatened and eroded by development. The need to protect land in the Sierra Nevada is especially critical, as it represents a huge portion of the State's water supply.
9. Consistent factors include a lack of secured funding to maintain and expand park capacity and stop the urbanization that is currently threatening precious wetlands and fragile ecosystems.

Based on research, consideration of numerous issues including those above, and a review by an expert advisory panel, the Parks & Open Space Committee has assigned the California Parks & Open Space infrastructure category the grade of a D+.



Public Policy Considerations

1. Recognize the vital role parks and recreation play in our State's economy and the quality of life of its citizens by examining success stories from other states.
2. Ensure that every community adopts an open space, conservation or recreation element within its General Plan that promotes the values of open space preservation, community park provision and accessible recreation features as essential design criteria for long-term planning.
3. Whenever possible, allocate on-going funds to purchase land for park and open space use to accommodate the growing population and to realize the full spectrum of social and ecological benefits.
4. Provide a steady funding stream for maintenance and operations to stop decades of deterioration of our existing parks and recreation facilities.
5. Identify parks, recreation and environment as needed and required infrastructure in the budgeting process at all levels including State, county and municipal.
6. Make every effort to construct master-planned walk able live-and-work communities that offer diverse mixed-use resources that can be readily accessible on foot without having to make extensive use of the automobile.
7. Incorporate "context-sensitive designs" into the design of master-planned communities and mixed-use projects.
8. Coordinate with agencies both in State and out-of-state to identify acreage goals and acquire land while it is still affordable.
9. Coordinate with agencies both in State and out-of-state to identify proximity goals in terms of the maximum distance a typical resident should live from a park or trailhead.
10. Coordinate with agencies both in State and out-of-state to identify design and implementation goals for recreational trail master plans.
11. Encourage public-private partnerships to acquire land and fund park development.

Security

1. Ensure that all of the primary arterials through the parks have sufficient provisions for accommodating emergency vehicles and buses for quickly and efficiently evacuating tourists.
2. Make sure that the parks have a sufficient network of gated service roadways reserved exclusively for service and emergency vehicle use.
3. Establish criteria for the number of evacuation routes by park acreage and topography. All parks should have at least three evacuation routes with significantly more evacuation routes needed for larger parks in mountainous terrain.
4. Ensure that the parks have an effective network of variable message signs and public address systems for notifying park attendees of an emergency and calling for immediate evacuation.
5. Ensure that the public literature provides clear emergency evacuation instructions for tourist routes to take and where to meet.
6. Formulate a homeland security policy related to parks and coordinate with the general nationwide homeland security policy.

Infrastructure Funding

An investment of approximately \$15 billion over the next 10 years, or an annual investment of \$1.5 billion would be necessary to bring the Parks and Open Space grade up to a “B.”

Ports

California Ports provide a vital link for goods movement from ship to shore and connection to the Interstate Highway system and the transcontinental railroad network. With the cooperation of City, County, State and Federal agencies, the Ports have and maintain an extensive infrastructure system to facilitate the movement of cargo to and from ship to shore. California Ports consist of 11 moderate to large-sized maritime facilities. There are also over 20 other smaller craft harbors and navigable landings but they were not evaluated in this report due to their size. Five of the 11 Ports have been evaluated separately in Regional Infrastructure Report Cards issued by ASCE California's individual Section/Branches, over the past two years.

The objective of this report was to evaluate and develop an assessment of the 11 larger California Sea Ports. The assessment included evaluating the overall condition, capacity, and operations analysis within the Harbor Districts utilizing the best information available. The Port's infrastructure assessment consists of evaluating the following components: wharves, railroads, roadways, utilities, channels and berths, container terminals, other marine terminals, gantry cranes, capacity and reliability of goods movement. Together they provide the basis for the efficient operation of the Ports' system. The Port infrastructure assessment was done by region based on prior available infrastructure evaluation reports. Previous infrastructure reports were available for the Bay Area (Oakland/San Francisco); San Pedro (Los Angeles/Long Beach); and San Diego Bay. There were six other Ports (moderate size) evaluated as part of this report, as well.

Findings

Fundamental components of infrastructure were considered in the development of the Port's infrastructure assessment. Each local regional Port has conducted individual infrastructure assessment in 2005 using different procedures and methodologies. Infrastructure facilities were identified and rated from A to F (with A being the best) and assigned a weight factor. The assessment does not include security nor federally owned infrastructure such as navy facilities.

The scoring system was generally based on the age of facilities in the Port's Harbor District as compared to its useful life or the physical condition of the facilities. The useful life utilized was: container wharves, 50 years; other wharves, 75 years; railroad tracks, 50 years; utilities, 50 years; and cranes 30 years. Roadway conditions were based on vehicular

levels of service. The railroad network included the Alameda Corridor which connects the San Pedro Bay to the major rail yards in downtown Los Angeles and transcontinental railroad system.

San Pedro Bay (Los Angeles/Long Beach)

The San Pedro Bay handles approximately 40% of all international shipments to the United States. The Los Angeles region (Counties of Los Angeles, Orange, Riverside, San Bernardino, and Ventura) is the nation's largest international trade port of entry. This area includes a population of approximately 18 million.

Bay Area (San Francisco/Oakland)

The Metropolitan area that surrounds the Bay Area in northern California includes nine counties (Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, and Sonoma). This area includes a population of approximately 7 million. The grade for the Bay Area Ports is a combined grade for the Ports of Oakland and San Francisco per the 2005 Bay Area infrastructure report card. Although Oakland has made significant improvements to its maritime facilities, the Port of Oakland has critical funding needs for both rail infrastructure and completion of its 50 foot Channel Deepening project.

San Diego

The San Diego Unified Port District infrastructure assessment focused on access issues entering/exiting the Port to and from inland destinations. This included landside transportation infrastructure such as bridges, roadways, and traffic condition. The San Diego region includes the counties of Imperial and San Diego with an estimated population of 4 million.

The overall grade for the California Ports was determined to be a C+.

Public Policy Considerations

The California Sea Ports and their infrastructure have an important role in the movement and supply of our nation's goods and materials. The overall infrastructure is in good shape today.



To maintain current levels, the regular assessment and upgrade of the infrastructure is vital to facilitate the cargo exchange from water to land via rail or truck and visa versa. It is equally vital to ensure an on-going maintenance program and continued redevelopment for the reliable movement of cargo. This extends beyond the Harbor Districts through connecting infrastructure such as roadway and rail corridors.

Improving the movement of goods in California is among the highest priorities for the State. A major facility of the movement of goods in California is its Sea Ports. The state's economy and quality of life depends upon the efficient, safe delivery of goods to and from the Sea Ports.

Security

US Customs Service/Transportation Security Administration (TSA), at some Port Facilities, have partnered with the Railroad Companies who have become so adept at tracking materials that they are considered experts in transport security. The partnership program is intended to develop, enhance, and maintain effective security processes throughout the global supply chain. Even with this expertise, Port Facilities still have vulnerabilities that must be addressed. The high volume of incoming container traffic increases the risk of biological, chemical, or nuclear materials being brought inside the country through the Ports. Technology to screen containers for these substances is being developed and installed. Port facilities are receiving help from the TSA, which has awarded \$92.3 million in grants to U.S. ports for security upgrades. Many facilities are already secured with fencing and lighting, and other devices. However, many are not. It will take time and additional funding to implement all the desired security improvements which are required.

Infrastructure Funding

Billions of dollars of investment go into the California Ports. The Ports have been built over the past several decades encompassing large complexes that facilitate the movement of goods from ship to shore moving millions of containers, auto's, energy sources, construction materials, liquid, and food products per year to their ultimate destination.

Handling more than 50% of the nation's waterborne cargo, the Ports have experienced an average of 7% increase in cargo each year since the mid-1980's. It is projected that that the cargo will double by 2010.

Ports require funding for the following infrastructure: roadways, bridges, security, waterways, wharfs, rail network, landfills, container yards, waterfront, and cold ironing. Cold ironing refers to providing ship to shore electrical power or alternative maritime power while a ship is at berth. This will enable ships to turn off their own engines and plug into

an electrical power source on land, which significantly reduces emission of pollutants into the air. Additional costs are included to address the Ports' Green Policy to improve impacts from maritime operations for the environment and communities that surround the Ports.

California Ports are looking at continued major improvements with total investments nearing \$12 billion forecasted over the next 10 years. A major portion of these investments is for marine terminal and related transportation developments. Although a large portion of the funding for these improvements comes from revenue generated by the shipping companies, there is a need for state and federal assistance for a portion of the infrastructure related improvements and particularly for assistance of needed roadway, rail, bridge, and security projects. It is equally important that Ports' adjoining roadways, freeways, bridges, and railways receive improvements for the efficient movement of goods through this global gateway. Many of the improvements are pending environmental assessments and funding.

The California Ports do not have the funding to carry out the required maintenance and capital improvements. All of the California Ports are looking at alternative methods for funding the annual investment needs of \$1.2 billion.

Solid Waste

The solid waste management system infrastructure provides an essential public service to the citizens of California. There are three basic components in the solid waste management system: collection, processing to remove recyclable and compostable materials, and disposal of waste that cannot be recycled. These three components, coupled with the implementation of waste reduction and recycled material market development programs, ensure that the integrity of the solid waste management system is well maintained for the citizens of California.

Timely and adequate collection of solid waste protects public health and safety, and the environment. An effective collection system prevents unsightly, vector-propagating, and odorous waste accumulation outside of residences and businesses. This also results in minimizing illegal disposal, discharge of waste to surface water bodies, and impacts to ecologically sensitive habitats.

Processing of waste involves the systematic separation and removal from the waste stream of valuable and recyclable materials, and of illegally disposed hazardous waste. Processing is done at transfer/processing facilities or conventional recycling centers prior to landfilling of residual waste.

Processing also involves converting green waste into biofuel, mulch, and compost. Removing recyclable materials and producing biofuel, mulch, and compost conserves scarce natural resources and assists jurisdictions in meeting the State's 50 percent waste reduction mandate. Processing

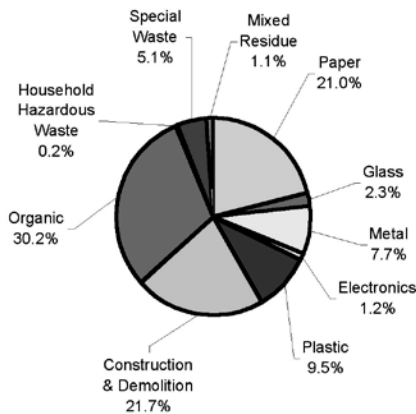


Figure 1:
Material Classes in California's Overall Disposed Waste Stream, 2003

is also crucial in maximizing the life of landfills. California landfills play a vital role in managing the variety of wastes generated by residents and businesses daily. They operate under some of the most stringent environmental standards in the country.

Findings

This evaluation indicates that a strong and sound solid waste management system exists in California. The long-range vision of policy decision makers, solid waste facility operators, manufacturing companies, and citizens are key elements to a properly managed solid waste management system. The State has sufficient long term disposal capacity to meet the demands of the population beyond 2025. To conserve the State's disposal capacity and preserve its natural resources, Californians have made a conscious effort to recycle 48 percent of all waste. A synopsis of the solid waste infrastructure is described below:

Collection Facilities: Most collection vehicle fleets are modern and have an average age of less than eight years. A majority of these vehicles are automated. Reducing improves safety and reduces reliance on manpower injuries. Furthermore, most hauling companies have scheduled vehicle preventive maintenance programs to minimize breakdown and lost of collection services. Employees also receive safety training on a routine basis to further reduce injuries and improve service to the public. To assist in recycling efforts, many collection companies provide multiple bins that allow source separation of recyclables and green waste from the waste stream. Some jurisdictions offer services for bulky items pick up. In addition, some companies specialize in the collection of single stream recyclables which further increases diversion. Most air districts are also requiring the collection vehicles to use alternative fuels which will improve air quality.

Transfer / Processing and Composting Facilities: California's transfer/processing and composting facilities are considered to be among the best in the nation with respect to policy, technology, and effectiveness. Although current levels of capacity are sufficient, new facilities or upgrades to existing facilities will be necessary to meet the demands of future population growth within the State. Continued development and expansion of high-value recyclable markets, including construction and demolition and organic materials, as well as improvements in processing technologies, will further expand the State's diversion capabilities and increase processing efficiency. Increased public recycling awareness and education along with manufacturer responsibility to use and produce recyclable materials are critical to achieving California's recycling goals.

Disposal Facilities: Since the implementation of Federal regulation Subtitle D in 1993, new landfills and expansion of existing landfills are subject to strict liner system design requirements. A large number of active landfills that commenced operation prior to Subtitle D, and are unlined, will be entering the post-closure maintenance period in the next 10 years. Due to the potential environmental impacts of landfills, the disposal system is heavily regulated by a multitude of regulatory agencies. As a result, operators are required to implement best management practices and abide by permit conditions that would ensure environmentally sound and safe operation of a landfill. Controlling air emissions, preventing groundwater impacts, and preventing landfill gas migration needs to be a priority of all landfill facilities.

Policies and Programs: For over a decade, local governments have been the leaders in implementing a host of award-winning recycling, waste reduction and pollution prevention programs in the State. The public's increasing sensitivity to the environment has resulted in continually increasing levels of waste reduction, from 25 percent in 1995 to 48 percent in 2004. The CIWMB adopted a zero waste goal, and the State Legislature is currently considering increasing the statewide diversion rate above 50 percent. Some jurisdictions have even reached diversion rates of 60 percent. Many California landfills, composting facilities, transfer/processing facilities, and manufacturing companies have garnered recognition and won awards from various organizations and regulatory agencies for their state-of-the-art design, operation, and effective waste reduction programs.

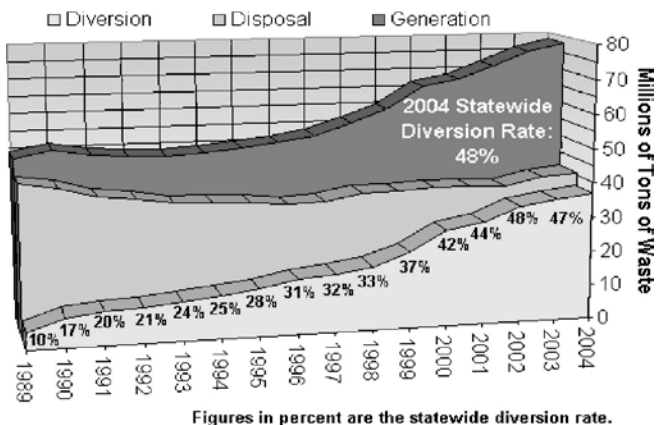


Figure 2:
Annual Waste Generated, Diverted, and Disposed from 1989 to 2004

However, population and economic growth continues to drive development in California, increasing waste generation and utilization of natural resources. These trends, coupled with reduced availability of suitable sites for new solid waste management facilities, will require public policy makers to continue finding creative solutions to meet solid waste management needs. State and local governments must rethink their programs to incorporate intrinsic environmental protection and meet new challenges by considering multi-disciplinary perspectives. This includes incorporating “Green Building” practices and shifting incentives to promote “greener” industries and processes. Government and the private sector must also continue to improve public educational programs and facilitate participation in recycling programs for residents and businesses to better utilize our limited resources. Manufacturing companies must also further the implementation of onsite recycling programs, use recycled materials in the manufacturing process, and produce goods that can be easily recycled, while minimizing products that will harm the environment. The overall grade for Solid Waste in California is B.

Public Policy Considerations

Notwithstanding its present favorable condition, there are some challenges that must be addressed to ensure that the system continues to provide the high level of service expected by the citizens of California. Continued development and funding will be required for these solid waste infrastructure needs:



- Conversion technologies need to be studied and developed that environmentally, technically, and economically feasible. They will optimize waste diversion systems and extract energy from materials that cannot be easily recycled.
- Waste reduction and diversion strategies must continue to be pursued to minimize environmental impacts associated with mining of materials and product manufacturing. Furthermore, markets for recycled materials, specifically construction and demolition debris and organics, need to be expanded.
- Transfer/processing facilities, recycling centers, and composting facilities need to be established and/or expanded where needed to ensure that California’s infrastructure serves the total population.
- Energy recovery from landfill gas must be fully implemented to reduce dependence on fossil fuels.

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- Agreements and legislation must be established to increase the role of manufacturers in designing products using recycled materials and to minimize environmental impacts throughout the production and consumption cycle. Furthermore, manufacturers must be encouraged to create products and components that are economical to recycle and/or environmentally friendly once they enter the waste stream.
 - Public education must be increase in order to transition from a “Throw Away” society to a “Zero Waste” society.
 - Collection centers must be established in remote rural communities in order to minimize illegal disposal of tires, household hazardous waste, and electronic waste.

Security

Overall, the solid waste management system is adequately secure. Many of the facilities are surrounded by man-made barriers or natural barriers that deter acts of crime and property damage. However, as urban sprawl continues and encroaches upon these facilities, operators will need to reevaluate their existing security systems and make improvements as needed.

Infrastructure Funding

The cost to maintain the current B grade for the solid waste infrastructure (i.e. collection, processing, landfilling, policy and programs) is estimated at \$5 billion per year or \$50 billion over the next 10 years. In addition to maintaining current structures and operations, this money is also used to meet the many federal, state, and local regulations that the solid waste industry (and landfills in particular are) is subject to. This money is also needed to close landfills as they reach capacity and to site new ones to meet the needs of California’s growing population. The current funding levels meet the projected needs as long as agencies and facility operators continue programming funds at present levels.

Transportation

California like most states across the nation is wrestling with the need to increase investment in transportation infrastructure. As our economy has been expanding and our population has been growing, our investments in the core elements of transportation infrastructure capacity, and operational improvements have not kept pace.

There are a total of six regional infrastructure report cards, produced by various ASCE Sections and Branches in California in the past two years. These regional report cards were used as the basis for developing the overall grade for Transportation in California. The grades obtained from these regional report cards were weighted by population, size of economy, State highway miles, number of bridges, number of transit ridership and tonnage in goods movement, and air quality status to create a single California grade.

Findings

All of these report cards had one thing in common. They all showed that much needs to be done to improve our transportation systems. The overall grade for Transportation in California was a D+.

Highways

California has one of the most robust economies in the world. We are adding almost 600,000 people to our state's population every year. By the year 2025, there will be 10 million more people living in California, out of which 7 million will be in southern California.

The Texas Transportation Institute in their 2005 Urban Mobility Report have provided some valuable data which illustrates the trend toward increasing delay time experienced by travelers at various California locations on our highway systems during the peak daily period of traffic. The increases in travel time have been particularly high in California's largest urban areas where capacity enhancement is more of a challenge.

Urban Area Travel Index	State	2003	2002	1993	1982
Los Angeles-Long Beach-Santa Ana	CA	1.75	1.77	1.73	1.30
San Francisco-Oakland	CA	1.54	1.55	1.44	1.21
Riverside-San Bernardino	CA	1.37	1.34	1.27	1.04
Sacramento	CA	1.37	1.34	1.19	1.07
San Jose	CA	1.37	1.39	1.34	1.18
San Diego	CA	1.41	1.40	1.22	1.06

Travel Time Index – The ratio of travel time in the peak period to the travel time at free-flow conditions. A value of 1.35 indicates a 20-minute free-flow trip takes 27 minutes during peak times. Free-flow speeds (60 mph on freeways and 35 mph on principal arterials) are used as the comparison threshold.

Transit

As the case with highways, investments in public transportation have not kept pace with population growth and inflation. With limited resources, policy makers must strike a balance between allocating resources to maintaining our existing infrastructure and expanding public transportation to meet demand. The Texas Transportation Institute in their 2005 Urban Mobility report documents the amount of delay that would be added to the transportation network nationwide if public transportation were not an option and those transit riders were forced to drive on our transportation network.

Regular public transportation service on buses and trains provides a significant amount of peak period travel in the most congested corridors and urban areas in the U.S. If public transportation service was discontinued and the riders traveled in private vehicles, the 85 urban areas would have incurred an additional 1.1 billion hours of delay. In 2003 public transportation service provided many additional benefits in the corridors and areas it served. Access to jobs, shops, medical, school and other destinations for those who did not have access to private transportation may have provided more societal benefits than the congestion relief received from transit. Typically, in contrast to roads, the ridership for transit is concentrated in a relatively small portion of the urban area. That is often the most congested area and the locations where additional road capacity is difficult to construct. In the 85 urban areas studied there were approximately 43 billion passenger-miles of travel on public transportation systems in 2003. The annual travel ranges from an average of 17 million miles per year in Small urban areas to about 2.7 billion miles in Very Large areas. Overall, if these riders did not have access to public transportation systems, the 1.1 billion hours of additional roadway delay would represent a 27 percent increase in delay and an additional congestion cost of \$18 billion.

A well balanced transportation system is critical to California's future. Investing in different transportation solutions provides the public with choices so they can determine which means of travel best suits their needs. In order to make Transit a viable option, it is important to dedicate funding for operation and maintenance of the system. People will continue to use single occupancy vehicles until they have a competitive transit choice that

provides practical travel times, flexibility, reliability, and safety. Until this investment is made, California will continue to face serious congestion problems on our transportation system.

The Texas Transportation Institute (TTI) has provided the following data for California, in their 2005 Urban Mobility Report:

City	Annual Delay (Person-hours)	Travel Time (Index)	Excess Fuel (1000 gal.)	Cost (\$M)
L.A.-Orange Co.	93	1.75	407,107	10,686
San Francisco- Oakland	72	1.54	96,571	2,605
Riverside- San Bernardino	55	1.37	34,952	863
San Jose	53	1.37	30,691	675
San Diego	52	1.41	59,215	1,411
Sacramento	40	1.37	25,609	619

Goods Movement

Goods movement, a vital component to California’s economic vitality, has been serially hampered and delayed due to lack of adequate capacity to move commercial, industrial and agricultural goods throughout the state.

For example Mexico is our nation’s number two trading partner and California’s number one export market. The land port between Mexico and California moves over \$24B dollars worth of goods per year and over 1.4 million trucks. Investments need to be made to improve the travel time and through put to further expand our economy. The sea ports in Los Angeles and Oakland are extremely congested and slowing down the movement of goods. Our inland ports producing agriculture with short shelf life are congested as well, forcing economic loss to our multibillion dollar food industry. The lack of investment in goods movement infrastructure is starting to take its toll on California’s economy forcing more pollution, loss of jobs, and movement of goods to ports outside of our state.

Additionally, low cost Asian manufacturing has led to the soaring container volume handled by both Southern and Northern California. Los Angeles and Long Beach harbors combined have seen the number of containers processed increase from 9.5 million in 1999 to 13.1 million containers in 2004, a 38.2% increase. While the container growth at the

Port of Oakland over the same time period (1999 to 2004) increased from 1.8 million in 1999 to over 2 million containers in 2004, a 23% increase.

From 2000-2004 California has lost 324,800 jobs associated with the manufacturing sector, most likely to Asia. This manufacturing shift to Asia has produced a significant opportunity for logistic job creation in Southern California. The Southern California Association of Governments estimates a potential job creation of 1,381,000, providing entry into the middle class for 44.2% of local adults.

To create these jobs, companies involved in goods movement must find that it will increase the speed and reliability of their operations in measurable ways. It has been estimated that moving a container load of freight averaged between \$25 and \$200 per hour. If goods movement is not reliable, delays could increase that cost 50% to 250% depending on the severity of the delay.

It is important to find creative solutions to the economic potential presenting itself in Southern California. Southern California has the potential to create over 1,000,000 middle class jobs if it undertakes infrastructure improvements that lead to measurable improvements to the various economic sectors such as retail. Failure to meet the infrastructure needs of high value product importers could result in economic hard times for a significant portion of the regions population.



Public Policy Considerations

- Support protection and expansion of transportation funds in California
- Endorse county sales tax measures (such as in Orange County, Santa Barbara and Kern) to create or extend dedicated and locally controlled revenues for transportation programs and projects.
- Endorse efforts to expedite transportation project delivery mechanisms through streamlining of project development and environmental clearances processes
- Endorse efforts to ensure the implementation of the SAFETEA-LU provisions to increase California's minimum guaranteed return for federal transportation funds from 90.5 % to 95%.
- Endorse efforts to ensure the timely funding of California's "Earmark Projects" in SAFETEA-LU.

Security

The Transportation Security Administration (TSA) and Federal Transit Administration (FTA) have undertaken a series of major steps to help prepare the highway system and transit systems to counter terrorist threats. Direct assistance to transit agencies through on-site readiness assessments, technical assistance teams, regional forums for emergency responders, grants for drills, training, and accelerating technology and research projects have and are being provided. Many requirements have been unfunded or under-funded. Critical Facilities are protected but the level of protection is still being upgraded at many facilities.

Infrastructure Funding

The transportation funding sources have been under assault over the last few years. For example, for the three budget cycles between 2002 and 2005, over \$4.5 billion of transportation money was either diverted or borrowed (on a long-term basis) for other non-transportation General Fund purposes. While the FY 2006-2007 state budget promises to pay back 1.4 billion of the transportation money borrowed, the repayment of those funds are 3.1 billion short of the urgently needed funding for transportation projects and programs.

Furthermore, even though California voters in 2002 overwhelmingly voted in favor of Proposition 42 to dedicate all gasoline sales taxes for transportation purposes, for the two subsequent budget cycles, these funds, about \$1.2 billion per year, were diverted to non-transportation purposes due to a declaration of budget emergency by the state legislature.

In face of these serious crises, some of the California Counties have established local sales taxes dedicated for transportation projects and programs. Today, 20 counties in California have such taxes that generate almost \$2.8 billion annually for transportation projects and services, equaling about 17% of all transportation spending in the state.

In 1999, the California Transportation Commission (CTC), in their "Annual Report to the California Legislature", identified \$77.5 billion of "unfunded transportation needs" in California over a 10-year period. The 2005 CTC Report has increased this amount to \$12 billion per year.

Regional Infrastructure Report Cards across California defined an annual local transportation need of \$5.9 billion. This figure combined with the CTC defined annual need for State-Wide Transportation needs, amounts to a funding need totaling \$17.9 billion per year. California, along with states across the nation, needs more investments for improving her transportation system.

Urban Runoff

Improvement of urban runoff water quality is an environmental challenge facing all Californians. Water pollution problems impact our daily enjoyment of life. Going to the beach isn't what it used to be, with frequent beach postings and closures. Not only do we need infrastructure improvements to clean our streams, storm drains and waterways, but we also need to change our old habits. All of this requires time, money, education and the willingness to improve our environment. Californians need watershed-based, multi-purpose and multi-agency solutions to address the urban runoff problem along with a dedicated funding source for treatment of urban runoff water quality.

California's urban environment includes storm drain systems separate from the sanitary sewer system. The storm drain systems were designed for flood protection; to quickly and efficiently transport stormwater away from homes, businesses and roads, and discharge it into creeks, rivers, lakes, bays and ultimately the Pacific Ocean. Unlike sewer systems that transport sewage to a treatment facility before it is discharged into the ocean, storm drain systems are designed and built to collect and efficiently transport stormwater runoff, not to remove pollution. "Stormwater" is defined as rain water or wet-weather runoff that does not soak into the ground and is conveyed by the storm drain system. "Urban runoff" includes both the wet-weather runoff and dry-weather runoff which comes from for example, over-watering of lawns and washing cars. Herein we will refer to all surface runoff that runs off urban drainage areas and reaches a stream or other body of water or a sewer/channel as "urban runoff." Urban runoff carries pollutants such as trash and yard waste, dirt motor oil, brake pad dust, grease, fertilizers, pesticides, and animal waste, as it flows off streets, roof-tops, parking lots, and yards, and into rivers, lakes, bays, beaches and ultimately the Pacific Ocean.

Engineers and scientists have recently determined that urban runoff is now one of the largest sources of pollutants into our rivers, lakes and the ocean. Each resident of California is a pollutant source and each person knowingly or unknowingly introduces pollutants to the storm drain system. State and Federal regulatory agencies determined that 685 water bodies (including beaches) in California were impaired in 2002. In short, they were not "fishable or swimmable" because of pollution due to urban runoff. When our beaches are littered with trash, posted as dangerous because of bacteria levels, or closed due to sewage spills, our State's economy suffers. Our beaches draw millions of people to California each year. When our beaches are polluted, we all suffer the consequences.

Urbanization has caused a number of other impacts to the water quality of runoff as well. The paving of much of our urban areas has resulted in significant increases in the amount of storm water runoff and has increased the speed of the water thus affecting the stability and assimilative capacity of natural streams. The introduction of dry weather flows to river systems has altered natural riparian ecosystems, allowing for the introduction of invasive, non-native plant species.

Common Urban Runoff pollutants include:

- Sediment: dirt, sand silt, construction spoils
- Animal waste
- Pesticides
- Fertilizers
- Automobile fluids: motor oil, grease, gasoline and antifreeze
- Grass clippings, leaves and other yard waste
- Household hazardous wastes like paints and solvents
- Trash and debris: plastic bags, plastic water bottles and cigarette butts
- Metals originating from sources such as automobile brake pads and exhaust.

The infrastructure necessary to make the State's waters fishable and swimmable is not sufficiently in place, nor do most Californians have sufficient knowledge regarding measures they can take to improve water quality. There is little to no Federal funding available to mitigate discharges of pollutants in urban runoff. Funding for urban runoff programs must come primarily from local or State revenue sources. Currently, programs to help clean up urban runoff are administered by local jurisdictions (permittees) as part of the National Pollutant Discharge Elimination System (NPDES) permit compliance programs. This program funding is obtained from a variety of sources, depending on the agency, including general fund, customer or developer fees, enterprise funds, and other sources. Most city and county programs to improve urban runoff water quality are not self-funding and rely on general fund or property tax revenue to support them. Most programs do not have sufficient funding for capital projects and the subsequent operations, maintenance, and monitoring programs needed to deal with the urban runoff pollution problem.

Addressing the urban runoff pollution problem will result in cleaner waterways. Although the cost may seem exorbitant, the return on

investment is immense. Not only will our ecosystems benefit but our beaches will be clean. Clean rivers, creeks and beaches will improve the quality of life and help the California economy.

The State Water Resources Control Board and the US Environmental Protection Agency, along with the Regional Water Quality Control Boards, have been adopting runoff pollutant standards measured by Total Maximum Daily Loads (TMDLs) conveyed by streams and bays throughout the State to derive additional regulatory requirements for reducing pollutants in urban runoff. Some of the first TMDLs were adopted in the late 1990s. Yet, the receiving waters are still impaired, beaches are still posted, and local funding has not emerged to improve the infrastructure.

Our water resources are vital for continued economic prosperity and for preserving diverse and valuable natural aquatic and riparian environments. Polluted urban runoff water has typically been viewed as a liability by the agencies responsible for cleaning up the problem. However, because water is so integral to the California economy, eliminating pollutants from urban runoff should really be viewed as an integral part of providing an additional water source to support wildlife and human needs. Treated urban runoff could be a potential source of groundwater recharge, reclaimed water for irrigation and agriculture among other potential uses. Integrating an urban runoff treatment project with a reuse component can lead to a water reuse project for beneficial uses.

Findings

Over 500 surveys were sent to government agencies responsible for the management of urban runoff including cities, counties, water districts, sewer districts, flood control districts, etc., as part of the development of five major regional ASCE Report Card efforts throughout the State. San Francisco Bay Area, Riverside/San Bernardino Counties, San Diego County, Los Angeles County and Orange County. These regional studies carefully analyzed extensive data gathered regarding the quality of urban runoff and receiving waters of local regional jurisdictions. This resulted in the determination of grades for urban runoff by investigating various systems attributes by region, including condition, capacity, and deferred maintenance. The statewide urban runoff committee then took these regional grades and developed an “average” grade weighted by population. Using this method, the “weighted average” statewide urban runoff grade was determined to be “D+”, clearly an unacceptable grade.

Public Policy Considerations

The following are needed to formulate public policy toward addressing and solving urban runoff water quality issues:



- Macro-level, watershed-based, multi-purpose and multi-agency solutions that integrate urban runoff treatment projects with water resource and ecosystem management efforts such as flood control, water reuse and habitat restoration thus leveraging resources to achieve multiple beneficial uses.
- Dedicated funding sources for urban runoff capital projects, educational programs, and operations, maintenance, and monitoring requirements.
- Cost-effective technologies and technically-sound projects and programs.

Infrastructure Funding

A survey of the amount spent on urban runoff programs by cities and counties was conducted by the State Water Resource Control Board in 2005 (Currier, et al., 2005). This survey found that cities and counties were typically spending from \$29 to \$46/household/year for programs to comply with their storm drain NPDES permits to improve urban runoff water quality. Based on the number of impairments and the overall grade of the urban runoff management system, this amount is not sufficient to make the State's waters fishable and swimmable. Be that as it may, the cost to run an urban runoff compliance program statewide, assuming 2.8 persons per household, and with a population of over 35 million, at a minimum, is between \$363 million and \$575 million per year.

The cost to treat urban runoff is another story. Two area-specific studies have been conducted to estimate the costs and economic impacts of treating or managing urban runoff to the point where the State's waters become fishable and swimmable and beneficial use impairments are eliminated. One study conducted by a team at the University of Southern California (Gordon, et al., 2002) assumed that all urban runoff and 70 and 97 percent of all stormwater would need to be captured and treated with advanced water treatment systems to achieve the water quality necessary to eliminate impairments. The costs of such infrastructure were estimated to be \$6,670 to \$42,000 per household per year. The second study conducted by a team including both the University of Southern California (USC) and University of California Los Angeles (UCLA) (Deviny, et. al., 2004) assumed that a combination of source control, low-impact development requirements for

new and re-development, substantially increased use of water capture and infiltration systems, diversion to the sanitary sewer for dry weather runoff, and a few advanced treatment systems for specific areas would eliminate impairments. Using these assumptions, the USC-UCLA team estimated urban runoff management cost would range from approximately \$414 to \$1,094 per household per year. While the discrepancy in estimates reflects differences in potential approaches, both studies clearly indicate the need for significant additional funding.

The cost to treat urban runoff is extremely speculative, ranging from \$414 to \$42,000 per household. Again, assuming 2.8 persons per household, and with a population of 35 million, the treatment costs statewide could range somewhere between \$5 billion and \$525 billion per year.

A minimal investment statewide of \$5 billion dollars for infrastructure to treat urban runoff is needed to begin to deal with the urban runoff water quality problem. In addition, the ongoing annual average cost of approximately \$470 million statewide is needed to conduct the regulatory compliance program for urban runoff. Therefore, a 5.5 billion dollar annual investment is needed to improve the grade for urban runoff to a B.

Wastewater

The collection and treatment of wastewater is an essential public service for California. California's 34 million residents and thousands of businesses flush over 4 billion gallons of wastewater into our public sewer systems every day. Nearly 100,000 miles of sewers and over 200 wastewater treatment plants process this waste and then discharge most of it in the streams, rivers, bays, estuaries and ocean front of California. Nearly 500 million gallons are transformed into reclaimed water that is used for a number of purposes including landscape irrigation, industrial cooling water, agricultural irrigation and groundwater recharge. The competent operation of these systems is vital to protecting public health and the environment. These systems generally perform adequately and for this reason the majority of California's surface waters are generally protected from impacts from these discharges. Overflows from the sewer systems or upsets of the treatment plants occur from time to time.

As an example, On January 15, 2006, 841,490 gallons of raw sewage spilled in Manhattan Beach and Hermosa Beach. This sewage spill lasted for over 15 hours and threatened underlying groundwater, resulted in hazardous bacteria levels along nearly nine miles of shoreline for four days and closed popular beach areas for an additional 23 days. The sewage spill resulted from the failure of a pumping plant located in Manhattan Beach. The plant failure caused sewage to backup and flow out of six manholes along the shoreline. Approximately 776,773 gallons of untreated wastewater seeped into the ground and 64,717 gallons flowed across area beaches and entered the Pacific Ocean. The challenge is to fund, plan, construct, operate and maintain, renew and replace these systems in a way that will minimize these events to the greatest extent possible. Our citizens and state and federal water quality protection laws require it.

Findings

The most visible and accessible aspects of wastewater infrastructure are the above-ground facilities: wastewater treatment plants and pump stations. There is fairly uniform information and reporting methods for these facilities. However, an estimated 80% of the value of wastewater systems lies below-ground in the sewer pipelines. For these facilities information is sparse, and what information is available has not been collected in a fashion that would allow simple comparison of one system to another. Measurement and monitoring is done remotely, if it is done at all.

The Bay Area wastewater agencies report that they have invested adequately in the pipes, pumps and treatment plants that protect water quality and public health, and that the current rates of spending are generally adequate to provide for ongoing maintenance needs. Condition, capacity and operation of the sewer systems and treatment plants were rated between B and A with an average of A-. On the other hand, the region has faced a number of enforcement actions on the part of the State Regional Water Quality Control Board and EPA, as well as lawsuits from environmental groups for sanitary sewer system overflows. These occurrences seem at odds with the assigned grade. Heavy rainfall events, the changing terrain of the area and the significant age of many of the systems in the Bay Area contribute to the problems encountered in this region of California.

The Inland Empire (San Bernardino and Riverside Counties) wastewater agencies report they are doing an adequate job of recycling treated wastewater for industrial and irrigation purposes. In this very arid region of the state, nearly all of the water that runs in a stream or river during the summer months is a result of treated wastewater discharges upstream. For this reason, the level of treatment and the consistent operation and maintenance of the system is essential to the environmental quality of the region. Water recycling efforts must consider the dual and sometimes competing goals of maintaining existing wetlands and providing new water resources for industrial and agricultural use. The Inland Empire agencies rate themselves with an overall grade of B- and recommend \$2.8 billion in new capital projects during the next 10 years to achieve a grade of B.

Los Angeles County wastewater agencies report that most of the 19,000 miles of sewers, 300 pump stations and 19 wastewater treatment plants are in fair to good condition. They gave their wastewater facilities an overall grade of B. However there are a number of facilities that need to be upgraded, rehabilitated or replaced today. They recommend an accelerated capital improvement program, spending \$2.6 billion in the next five years to address the problems they found in their system.

Orange County wastewater agencies report that investment in wastewater treatment and sewer systems is on the rise, using special district enterprise funding models. There are approximately 7000 miles of sewers, 220 pump stations and 11 wastewater treatment plants in the county. While many of the systems are operating adequately, some of the aging sewer systems are in need of immediate attention. Over \$1 billion is needed in the next 10 years to fund various site-specific local and regional rehabilitation

projects to bring the systems from current levels up to a “good” condition. They gave their wastewater facilities an overall grade of C+.

The San Diego County wastewater agencies report that their wastewater treatment facilities are in fair to good condition while a number of the collection systems, although having adequate capacity, are in poor physical condition. Routine inspection is needed, and funding for replacement, upgrades and rehabilitation are needed to maintain compliance with regulations. There are 7000 miles of sewers, hundreds of pump stations and 30 wastewater treatment plants in the county. Sewer systems rated a C+ and wastewater treatment plants rated a B for an overall grade of B-. They caution that this is an average grade and that some systems are in far worse conditions than others. Most cities and agencies have some form of master plan. Collectively, they estimate five-year capital costs of \$2.1 billion.

The above reference data represents ratings of the wastewater systems for 75% of California’s population. No reliable data was available for the wastewater systems representing the remaining 25% of the population. Overall, the wastewater infrastructure in California earns a grade of C+.

Public Policy Considerations

Nearly all planning, funding, design and construction activities which support wastewater infrastructure are the responsibility of the cities or local wastewater treatment agencies that own and operate these facilities. They are regulated by the California Regional Water Quality Control Boards and the US Environmental Protection Agency which issue permits to discharge containing very specific terms and conditions. Nevertheless, the cities and local agencies have considerable discretionary authority regarding how the permit conditions are to be achieved. Their decision-making bodies are the city councils or elected boards that meet and deliberate about these important matters. All are obligated to conduct their meetings in open and all of the documents, reports and contracts that are the bases for their decisions are available to the public. Citizen involvement is helpful to provide decision-makers with an understanding about the public’s expectations about adequate wastewater infrastructure, willingness to pay and support for higher fees for the substantial operating and capital expenditures needed to sustain a competently performing system.



Statewide Developments

Treatment and reclamation facilities have been required to operate under EPA's NPDES permits since the Federal Clean Water Act was passed in 1972. The State Water Resources Control Board adopted the final language for Waste Discharge Requirements on May 2, 2006. To facilitate proper funding and management of sanitary sewer systems, each municipality that owns or operates its sewer system must apply for a WDR permit for its wastewater system. Each municipality must develop and implement a system-specific Sewer System Management Plan. This will require long-term local commitments for equipment, rehabilitation projects, and staff in all parts of California.

Security

Providing security for all of our wastewater assets has started to become a national focus. Most of the attention has been on the treatment facilities thus far. This effort will require new policies to be developed, vulnerability assessments to be conducted and funding mechanisms put in place for at-risk parts of the collection systems as well as the already more secure treatment and reclamation facility sites.

Infrastructure Funding

Some public wastewater management agencies have detailed capital expenditure master plans that are expressed in either five-year or ten-year planning horizons. Some public wastewater management agencies plan from year-to-year, oftentimes influenced by the funding decisions that emerge from local, state or federal funding and lending authorities. Because of the variation in approach that public agencies use in long-term fiscal planning, it is a challenge to establish a reasonable statewide estimate. Using data from the better and well-documented master plans from agencies in the state, their known service populations and extrapolating their costs to the total population of the state, a reasonable estimate can be established. Based on this approach, the annual statewide capital expenditure for sewer systems, pump stations and wastewater treatment plants is estimated to be \$2.3 billion. This does not include operating costs for these systems. If statewide capital and operating expenditures are sustained at needed levels, then reliable operation of public wastewater infrastructure should be assured.

Water

California's water infrastructure is vital to the economic well-being, environmental integrity, and overall quality of life of all Californians. Our water infrastructure serves all sectors of our great State, from our vast agricultural and commercial interests to the more than 35 million people who reside here. That infrastructure is composed of many elements, including supply sources (e.g., groundwater, the Sacramento-San Joaquin Delta, rivers, and lakes and reservoirs for capturing snow and rainfall), regional and local treatment facilities, pumping plants, transmission and distribution systems, and other related appurtenances. The ability to meet the water needs of existing and future Californians is not only dependent on our available supplies, but also on the condition of the numerous facilities required to collect, store, treat, and deliver that water to customers. Just as important as the maintenance and periodic replacement of our production, storage and conveyance facilities are those additional system improvements and security enhancements required to vigilantly protect the quality of our drinking water, withstand natural catastrophes, and adapt to global climate change.

Many components of California's water systems are nearing the end of their design (or useful) life. The need for ongoing maintenance and replacement is demonstrated by infrastructure failures like the following incident reported in LA Times, July 2005.

“A ruptured 16-inch main was repaired Thursday morning and one northbound lane was reopened in the evening after the sinkhole was plugged with crushed rock material, according to authorities. Some pipes in the Laurel Canyon area are between 60 and 80 years old, making them among the oldest in Los Angeles, Pierson said. Hundreds of utility customers lost water and were forced to boil their water when the 16-inch main ruptured around 4:30 p.m.”

As noted by the Department of Water Resources (DWR) in the recently released *California Water Plan Update 2005* (the State's strategic plan for water), the State Water Project is over 30 years old, and the Federal Central Valley Project is over 50 years old; moreover, some local water systems have facilities that were first placed in service a century ago. Of the 14 major recommendations made by DWR in the *California Water Plan Update 2005*, one directly addresses the needs of California's water infrastructure:

“California must maintain, rehabilitate and improve its aging water infrastructure, especially drinking water treatment facilities, operated by state, federal and local entities.”

The Sacramento-San Joaquin Delta is a vital link in protecting California's economic well-being and quality of life. The Delta acts as a conveyance system for water supplies to 23 million Californians and a significant portion of the State's agriculture and industry. From a systems perspective, infrastructure reliability is more important than ever, because it provides the flexibility to move water when it is available from the Delta, where environmental regulatory restrictions often limit the times when pumping is allowed. Aging levees built on peat soils, land subsidence, seismic and flood threats, and sea level rise all contribute to an unacceptable risk profile today. Enhancing the Delta's water delivery capabilities, while repairing its fragile levees (addressed elsewhere in this report card), and protecting its environmental resources can be accomplished in a way that can benefit all Californians.

One key to California's future water picture is better management of our limited resources. Management tools can include water use efficiency strategies (such as recycled water), groundwater recharge and storage ("conjunctive use"), watershed management, and efforts geared toward achieving and sustaining behavioral and cultural changes to reduce water consumption.

California's complex water system is actually comprised of many separate systems ranging in size from very large statewide or regional storage and delivery systems (e.g., the California State Water Project, Metropolitan Water District's (MWD) Colorado River Aqueduct, the Federal Central Valley Project and the City of Los Angeles' Owens Valley Aqueduct) to small local public and private water systems that may serve only a few people. This Report Card draws on the recent findings of six water infrastructure Report Cards covering the nine-county San Francisco Bay Area, the greater Sacramento region (including 24 northern California counties), the two-county Inland Empire region, Los Angeles County, Orange County, and San Diego County. Together, these six regions are home to approximately 30 million people or roughly 85 percent of California's total population.

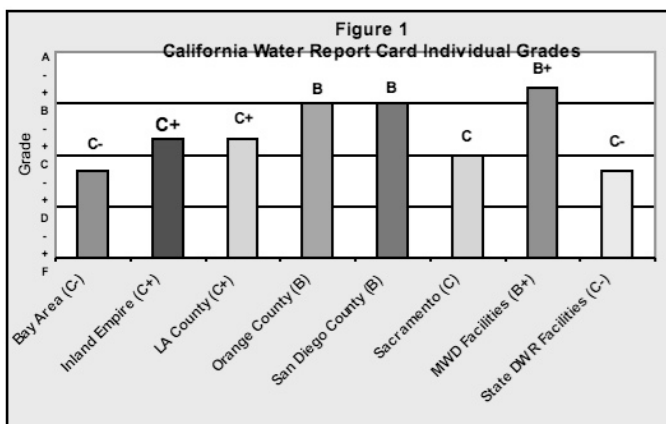
These regional Report Cards considered a number of parameters including reliability of supply, storage and distribution capacity, seismic vulnerability, security and safety, and water quality. The respective ages of the tens of thousands of miles of transmission and distribution pipelines and thousands of pumping stations and storage facilities were also considered. Again, this is an especially important factor given that many of these facilities were constructed in the first part of the last century, thus, a large portion of them have exceeded their useful lives. However, it is important to note that older facilities can still provide good service

beyond their useful lives, though sometimes at lower levels of efficiency and/or reliability, if properly maintained.

Findings

The six regional water Report Card grades are summarized in Figure 1. As noted in that figure, the 2005 grades for the Bay Area, Inland Empire, Los Angeles County, Orange County and San Diego County, and the 2006 grade for Sacramento, were C-, C+, C+, B, B and C, respectively. In addition to these six grades, this Report Card also considers the condition and capacity of regional facilities operated by the Metropolitan Water District of Southern California and the California Department of Water Resources (DWR), which are respectively B+ and C-. The risks associated with Delta levee failure alone caused a reduction in the grade for the State Water Project system to “C-“ from “B” and has implications for all Californians that rely on the Delta.

The overall un-weighted average of all eight grades is a C+. While some of the regions are more populated than others, applying representative weighting factors to the analysis does not result in any significant changes in the overall grade. The overall grade is therefore determined to be a C+.



Public Policy Considerations

The number one water challenge in California today is the long term sustainability of the Sacramento-San Joaquin Delta. A key to addressing this challenge is assure that fixes to the Delta, while reflecting public values, must be grounded in science and be wise investments of public funds. So much of the State’s water supply is dependent on this source that any further delays in addressing these much-needed improvements could potentially result in a Hurricane Katrina-



like catastrophe in California. The threat extends beyond flood control to include water supply, transportation, and energy infrastructure, all of which traverse the Delta region.

Through better management and stronger political will, we can increase supply reliability and reduce long-term capital costs. Maintenance and upkeep of infrastructure that is often deferred is critical to assuring working systems for future generations. While significant funding will still be needed, the total cost can be reduced by identifying innovative and cost-effective ways of addressing our water needs. Many of these resource management strategies are discussed in further detail in the recently released California Water Plan Update 2005 (www.waterplan.water.ca.gov/cwpu2005/index.cfm). Several key action items to address these needs are highlighted as follows:

Key actions that can be taken to improve our water future include:

1. Support funding for and implement those projects throughout the State required to address the local and regional infrastructure needs identified in this report.
2. Improve the reliability of California's water supply by
 - a. Reversing both the short- and long-term threats to the Delta water conveyance system.
 - b. Developing additional groundwater and surface water storage projects.
 - c. Developing seawater and brackish water desalination projects.
 - d. Developing water use efficiency projects, such as recycled water systems and other pertinent improvements.
3. Aggressively support public education aimed at creating and sustaining behavioral changes to wisely use our limited water resources.
4. Implement appropriate security measures to protect our infrastructure and drinking water quality from the potential impacts of natural disasters and/or terrorists attacks.

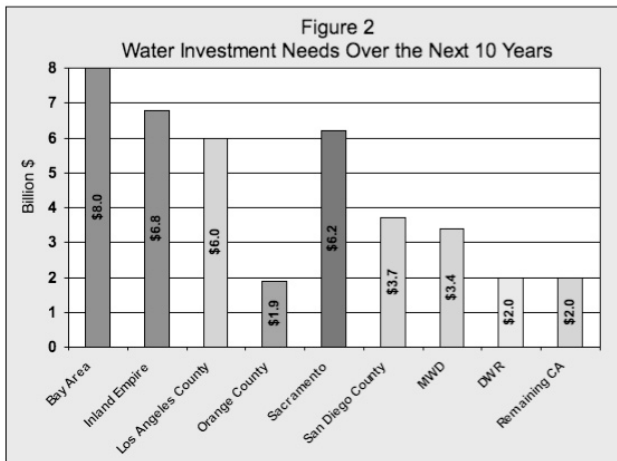
Security

Improving the security of our nation's drinking water infrastructures has become a top priority since the events of 9/11. Significant actions are underway to assess and reduce vulnerabilities to potential terrorist attacks; to plan for and practice response to emergencies and incidents; and to develop new security technologies to detect and monitor contaminants and prevent security breaches. As required under the Bioterrorism

Preparedness and Response Act, each drinking water utility serving more than 3,300 persons must conduct a vulnerability assessment and an emergency response plan outlining response measures if an incident occurs. Though assessments by water utilities in CA were required and submitted in 2004, funding to support infrastructure response measures, as needed, is important to assure proper security of our State’s critical water infrastructure.

Infrastructure Funding

Water infrastructure investment needs over the next ten years for each of the six regional areas are shown in Figure 2.



The ten-year investment needs for both MWD and DWR are also reflected in Figure 2 (DWR projects a \$1.0 billion need over the next five years; this report conservatively assumes an additional \$1.0 billion will be needed over the ensuing five year period from 2011-2016). It is important to note that this cost does not include funding to address problems associated with the Delta. Additionally, a need of \$2.0 billion has been conservatively estimated to represent the portion of California’s water infrastructure which serves the remaining 15 percent of California’s population not covered in the six regional Report Cards. These totals reflect the cost of capital improvements needed to address new growth and replace deteriorating and aging facilities. In those areas experiencing rapid growth (such as the Inland Empire), capital needs are higher than might otherwise be expected. The total identified ten-year investment need required to support our growing population is \$40 billion. This represents an annualized cost of approximately \$4.0 billion.

What You Can Do

This Guide offers continuing evidence that California's public works challenges are enormous and complex, and will not solve themselves. It is now up to you, the concerned citizen, who understands the economic and environmental benefits of a healthy infrastructure, to push for action. We have reviewed what has happened and is happening in California. Here are some steps you can take to do your part in renewing California's infrastructure:

1. Learn all you can about California's infrastructure problems.
2. When you see a problem, find out what level of government has jurisdiction over it. Sometimes various levels of government deal with different aspects of the same problem.
3. Search the Internet. Agencies at all levels of government now have Web sites that list laws and regulations that pertain to your problem. Your mayor and state representatives probably have sites too, which may be your link to other government and advocacy group resources. If you know of an interest group that deals with the area you're interested in, visit its site.
4. Contact the California Department of Transportation, your city government and other sources to learn about plans for ensuring adequate roads, schools, parks and water systems.
5. Ask business groups, such as your Chamber of Commerce, to examine the infrastructure in your community and its affect on local businesses, employment and the economy.
6. Regularly attend meetings held in your community about pressing infrastructure problems.
7. Express your concern to public officials such as your mayor and school board. Ask them how they plan to solve infrastructure problems. Urge your neighbors to support your cause.
8. Volunteer for--or organize--citizen advisory committees dealing with your community's infrastructure issues.
9. Support local, State and Federal officials who understand and are committed to infrastructure renewal. Ask them to make infrastructure an election issue, just as they would education, crime or health care.
10. Work to help pass local bond issues to repair, replace and expand your roads, parks, water systems and schools.
11. Write letters to the editor of your newspaper, your state representatives and members of Congress, expressing your concerns and opinions on infrastructure.
12. Talk to Civil Engineers Urban Planners in your area about solutions and needs.

Methodology

Overall California Infrastructure Report Card Objective

To build widespread support and understanding regarding the importance of public infrastructure facilities, systems, and their impact on the quality of life and economic vitality in California.

Organizational Structure

The Report Card was developed through the efforts of three committee levels. The committee members are listed in a separate section of this guide.

The Infrastructure Working Committees consisted of technical experts in the field – including both public and private sector participants. Each committee developed the detailed methodology for its specific category, collected and evaluated the data, prepared its section of the “2006 Report on California’s Infrastructure”, and assigned the initial grade.

The Expert Advisory Groups were comprised of leaders in the public sector, consultant/private industry, academia, and the environmental community. Their responsibilities were to review and evaluate the findings of the Working Committees, and to establish public policy considerations for each infrastructure category.

The Executive Committee was responsible for organizing and guiding the overall Report Card effort.

Development of Report Card Grades

In the development of Report Card Grades, four fundamental components of the infrastructure were considered:

Condition

What is the existing or near future condition of the infrastructure facility? In assessing the condition of the infrastructure, the immediate future conditions (up to three years) included improvements funded or in design.

Capacity

Are the current facilities able to support the current population? Will the existing and planned (funded) facilities be able to support the community in ten years? The existence of Master Plans, Funding Plans, and Capital Improvement Programs were key factors in the capacity assessment.

Operations

The Working Committees each developed parameters applicable to their areas. Key issues were: Is the specific infrastructure system complying with existing regulatory requirements? Do the organizations have sufficient funding for facility maintenance.

Security

Does the infrastructure element provide adequately for preparing for, or responding to, natural or manmade, (e.g. terrorism) disasters?

Weighting Factors and Grading Criteria

The weighting factors applied by each working committee are described in their report, using the four categories listed above. The California Report Card effort follows the ASCE National Report Card's approach based on the following scale:

A	=	90-100%
B	=	80-89%
C	=	70-79%
D	=	41-69%
F	=	40% or lower

Glossary

Best Management Practice

(BMP) an engineered structure or management activity, or combination of these, that eliminates or reduces and adverse environmental effect of a pollutant.

Flood Control Channel

Open waterway that is designed to carry large amounts of rain water. These structures are often lined with concrete to help control flood waters.

Gutter

Area formed by the curb and the street to prevent flooding by channeling runoff to storm drains.

NPDES - National Pollutant Discharge Elimination System

The US EPA regulation that regulates the point sources (treatment plant) discharge of pollutants into waters of the United States.

Point Source Pollution

Pollution from a single identifiable source such as a smoke stack or a sewage-treatment plant.

Pollutants

Materials can include, but are not limited to, trash, paper, plastics, cleaning chemicals, animal waste, yard wastes, used oil, fertilizers, pesticides, sediment, metals, fuels, solvents, detergents and fecal coliform.

Pollution

A human or naturally caused change in physical, chemical, or biological conditions that result in an undesirable effect on the environment.

RWQCB - Regional Water Quality Control Board

The local arm of the State Water Resources Control Board that regulates the quality of water resources.

Receiving Water

Of a watercourse or waterbody that receives runoff or wastewater.

Runoff

Water that flow over land surfaces and does not percolate into the ground.

Runoff Pollution *(also stormwater, urban runoff, and storm drain pollution)*

Rain and water from irrigation, garden hoses, or other activities that washes pollutants off of streets, parking lots, yards, and landscapes and into the storm drain system.

Sanitary Sewer System

General term applied to waste water treatment plants that treat mainly household waste water supplied from plumbing/sewage lines. A series of biological and chemical processes are used at these treatment plants to remove many pollutants before the effluent is deposited into natural bodies of waters.

Source Control

Action to prevent pollution at its origin.

Storm Drain System

A system which includes grates, gutters, underground pipes, creeks or open channels designed to transport rain from developed areas to a receiving body of water.

Watershed

Geographic area of land from which all runoff drains into a single waterway.

Watershed Management Approach

The watershed management approach is the specific method by which the Regional Board implements watershed management. Features include the targeting of priority problems, stakeholder involvement, developing integrated solutions, and evaluating measures of success. The entire watershed, including the land mass draining into the receiving water, is considered.

Watershed Management Areas

(WMAs) are the geographically-defined watershed areas where the Regional Board will implement the watershed approach. These generally involve a single large watershed within which exists smaller subwatersheds but in some cases may be an area that does not meet the strict hydrologic definition of a watershed.

WDR

Waste Discharge Requirements

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References

Only the main references are listed here. The detailed comprehensive references for each individual area are listed in the relevant section of the “2006 Report on California’s Infrastructure – Issue Briefs”

2005 Report Card for America’s Infrastructure American Society of Civil Engineers

Renewing America’s Infrastructure – A Citizen’s Guide

American Society of Civil Engineers

1015 15th Street, N.W. Suite 600

Washington, DC 20005

Regional Report Cards: A Guide to Grading Your Community’s Infrastructure

Revised September 2001

The above three reports are available from ASCE at 1015 15th Street, N.W.

Suite 600 Washington, DC 20005 or on the WEB site: www.asce.org/reportcard

2005 Report on Orange County’s Infrastructure – Issue Briefs

Civil & Environmental Engineering Affiliates, UC Irvine October 2005

California’s Infrastructure Challenge

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The above three reports are available from the Department of Civil &

Environmental Engineering, UC Irvine. Irvine CA, 92697 or on the WEB site: www.eng.uci.edu/civil • www.eng.uci.edu/ocreportcard

2004 San Diego Region Infrastructure Report Card 2005 San Diego Region

Infrastructure Report Card prepared by ASCE San Diego Section and available at www.asce-sd.org

Report Card 2005 for Bay Area Infrastructure prepared by ASCE San Francisco Section and available at www.asce-sf.org

2002 Report Card for Los Angeles County Infrastructure 2005 Report Card for

Los Angeles County Infrastructure prepared by ASCE Los Angeles Section and available at www.ascelasection.org

2006 Report Card for ASCE Sacramento Region Infrastructure prepared by

ASCE Sacramento Section and available at www.asce-sacto.org

2005 Report card for Riverside and San Bernardino Counties prepared by ASCE

Inland Empire Branch and available at www.ascelasection.org



The American Society of Civil Engineers enhances the welfare of humanity by advancing the science and profession of engineering.

The Society offers continuing education courses and technical specialty conferences; develops technical codes and standards for safer buildings, water systems, and other civil engineering works; publishes technical and professional journals, manuals, and a variety of books; works closely with Congress, the White House, and federal agencies to build sound national policy on infrastructure and engineering issues; and supports research of new civil engineering technology and materials.

Founded in 1852, ASCE has more than 125,000 members worldwide and is America's oldest national engineering society. The Society is currently celebrating its 150th anniversary.

ASCE Region 9 consists of State of California and has over 12,000 members. Information on activities is available at: www.asce.org

The Executive Committee also wishes to acknowledge the help and support of the following ASCE Section/Branches:

Region 9

Los Angeles Section

Orange County Branch

San Diego Section

Riverside Branch



The American Public Works Association is an international educational and professional association of public agencies, private sector companies, and individuals dedicated to providing high quality public works goods and services.

Originally chartered in 1937, APWA is the largest and oldest organization of its kind in the world, with headquarters in Kansas City, Missouri, an office in Washington, D.C., and 67 chapters throughout North America. APWA provides a forum in which public works professionals can exchange ideas, improve professional competency, increase the performance of their agencies and companies, and bring important public works-related topics to public attention in local, state and federal arenas.

The association is a highly participatory organization, with hundreds of opportunities for leadership and service, and a network of several dozen national committees in every area of public works. Governed by a 17-member board of directors, elected at both the regional and national levels, APWA is an open, flexible association with a diversified membership of 26,000 and a reputation for quality services and products.

The Executive Committee also wishes to acknowledge the help and support of the following APWA Chapters:

- Northern California Chapter
- Southern California Chapter
- San Diego Chapter
- Ventura County Chapter



CELSOC

CONSULTING ENGINEERS AND LAND SURVEYORS OF CALIFORNIA

The Consulting Engineers and Land Surveyors of California (CELSOC) is a statewide organization dedicated to enhancing the consulting engineering, land surveying, and construction related service professions. CELSOC advocates for promoting the private enterprise system and protecting the general public. CELSOC comprises 23 local chapters with over 1,100 member firms. Member firms range from sole proprietorships to multi-million dollar corporations and engage in all phases of engineering and surveying, including civil, structural, geotechnical, electrical, mechanical, inspection and materials testing. Each member is also automatically a member of CELSOC's national affiliate, the American Council of Engineering Companies (ACEC).

CELSOC promotes cooperation among member firms for the public interest and the general advancement of the professions. CELSOC's goals are accomplished primarily through the work of its statewide committees. Twenty-four regular committees function during the year, with tasks that vary from administrative and liaison assignments, to professional objectives, to responsibility for improving business practices. CELSOC has also created several special interest Academies which focus on special areas of practice.

The Consulting Engineers and Land Surveyors of California (CELSOC) organization was formed in 1992 through the merger of two associations. Both predecessor organizations represented the interests of engineers and surveyors in California since the early 1950s.

The Executive Committee also wishes to acknowledge the help and support of the following CELSOC Chapters:

California State Office

North Coast Chapter

Los Angeles County Chapter

Orange County Chapter



The purpose of the UCI Civil and Environmental Engineering (CEE) Affiliates is to provide an effective means to offer support and guidance to the Department, its programs and students, and to act as an interface between the professional civil and environmental engineering community in Southern California, particularly in Orange County, and the University. The CEE Affiliates include senior executives representing leading civil and environmental engineering firms (both large and small) and public agencies, as well as individual members.

Benefits include the creation of numerous opportunities for members:

- affiliation with Orange County's only major research university
- maintenance of strong industry/university relations
- distinction of "making a difference" in the development of Civil and Environmental Engineering at UCI
- affiliate quarterly seminars and social/student functions
- technical interaction and collaboration with faculty and students
- Student recruitment through early contact with top students
- guidance to student projects
- guest speaking in classes and at students society meetings
- student scholarships

Member annual dues are used to support laboratory and equipment needs, program enhancements in the Department (e.g., support of ASCE, ITE, and Chi Epsilon student chapters), student scholarships, and CEE Affiliate meetings and functions.

For more information, contact the Department of Civil and Environmental Engineering, at (949) 824-5333, fax (949) 824-2117, or www.eng.uci.edu/civil



The California Infrastructure Coalition is a broad-based, non-profit organization whose mission is to build support for dedicated and consistent sources of funding sufficient to sustain California's vital infrastructure facilities and systems. Please visit our website at www.calinfrastructure.org.

ASCE

APWA


CELSOC
California Electric Light and Power Association

