

# ASCE CALIFORNIA

## INFRASTRUCTURE REPORT CARD 2006



A Citizen's Guide

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## 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.

*Yazdan Emrani, P.E.*

*Co-Chair*

*California Infrastructure Report Card*

*President, ASCE Orange County Branch*

*Mike Kincaid, P.E.*

*Co-Chair*

*California Infrastructure Report Card*

*Past President, ASCE San Francisco Section*

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*American Society of Civil Engineers*

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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.

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## 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.

<b>ASCE CALIFORNIA INFRASTRUCTURE REPORT CARD 2006</b>	
<a href="http://www.asceareportcard.org">www.asceareportcard.org</a>	
Aviation	C
Levees / Flood Control	F
Parks / Open Space	D
Ports	C+
Solid Waste	B
Transportation	D+
Urban Runoff	D+
Wastewater	C+
Water	C+
<b>California's Infrastructure GPA</b>	<b>C</b>
Annual Investment Needs	\$37 Billion



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**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

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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.

## 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

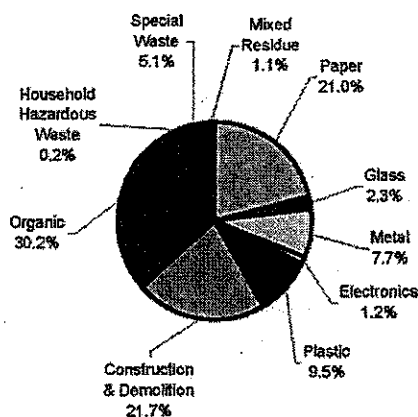


Figure 1:  
Material Classes in California's Overall Disposed Waste Stream, 2003

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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*

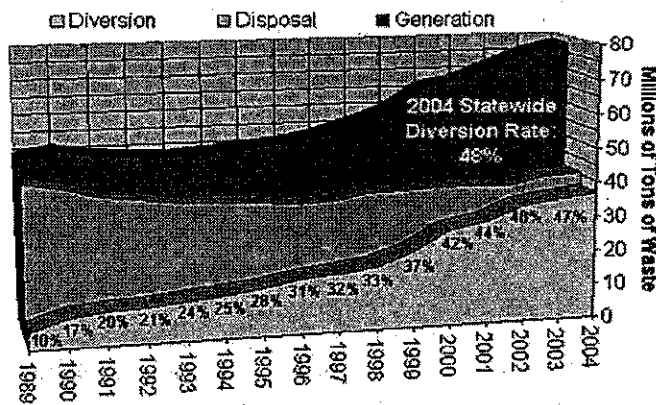
This evaluation indicates that a strong and sound solid waste management system exists in California. The long-range vision of policy decision makers, solid waste facility operators, manufacturing companies, and citizens are key elements to a properly managed solid waste management system. The State 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.



Figures in percent are the statewide diversion rate.

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

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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.





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## California Infrastructure Report Card Solid Waste Methodology Document

April 6, 2006

### Objective:

Evaluate a representative sample of collection systems, transfer/processing facilities, green materials facilities, and disposal facilities to evaluate the existing and long-term solid waste infrastructure in terms of condition, capacity, operations, and safety/security. Furthermore, evaluate the state of California's recycling efforts as well as gas-to-energy programs.

### Scope:

1. Solid Waste Collection Systems
2. Transfer/Processing Facilities and Green Materials Facilities
3. Disposal Facilities
4. Jurisdictional Policy and Programs (i.e., AB 939, gas-to-energy programs, etc.)

### Issues:

1. Is the current age and condition of California's solid waste infrastructure adequate to meet the public demand?
2. Does the state of California have adequate landfill capacity to provide the long term disposal needs of the public?
3. Are the transfer/processing facilities, green materials facilities, and landfills operating in a manner that is acceptable (i.e., aesthetics and odor control) to the surrounding communities?
4. Are the transfer/processing facilities, green materials facilities, and landfills operating in a manner that meet the regulatory standards for protection of the environment?
5. How secured and safe is our solid waste infrastructure?
6. To what extent is the state of California being proactive in introducing new laws and regulations to protect the environment as it pertains to solid waste management?
7. To what extent are landfills in the state of California utilizing gas-to-energy technologies versus other states?
8. How successful have cities been in meeting the 50% diversion mandate as set forth in AB939?
9. What steps does the solid waste industry need to take if the grade is less than a "B"? How much investment is necessary to maintain a "B" grade over a ten year horizon?

### Data Sources:

1. 2005 Updating Orange County's Infrastructure: A Citizen's Guide
2. 2002 Report Card for Los Angeles County Infrastructure
3. 2005 Report Card for Inland Empire's Infrastructure
4. California Integrated Waste Management Board
5. Environmental Protection Agency
6. American Society of Civil Engineers
7. Major haulers
8. Major transfer/processing facilities and green materials facilities
9. Various County Integrated Waste Management Plans and solid waste/municipal reports

### Steps:

1. Identify committee members. Identify chairpersons for collection systems, transfer/processing facilities, disposal facilities, and Jurisdictional Policy and Programs.
2. Identify solid waste facilities and collection systems to evaluate.
3. Identify evaluation criteria and establish scoring system.
4. Identify data needs.
5. Identify data sources.
6. Collect data.
7. Evaluate solid waste facilities and collection systems.
8. Assign grades.
9. Prepare write-up.
10. Estimate required funding if the overall grade is below "B".

### Completed:

1. Identification of committee members and their respective lead roles -
  - a. Collection Systems: Sylvia Castillo, City of San Diego.
  - b. Transfer/Processing Facilities and Green Materials Facilities: Paul Johnson, R.W. Beck, Inc.
  - c. Disposal Facilities: Kevin Kondru, County of Orange Integrated Waste Management Department.
  - d. Jurisdictional Policy and Programs: Paul Alva, County of Los Angeles Department of Water and Power.
2. Drafted evaluation criteria and establish scoring system.
3. Identified disposal facilities to evaluate. Identified data sources for disposal facilities

### Remaining:

1. Identify collection systems, transfer/processing facilities, and green materials facilities to evaluate.
2. Finalize evaluation criteria and establish scoring system.
3. Identify data needs.
4. Identify data sources.
5. Collect data.
6. Evaluate solid waste facilities and collection systems.
7. Assign grades.
8. Prepare write-up.
9. Estimate required funding if the overall grade is below "B".

### Help Needed:

1. Identify easily accessible data sources that can be used to evaluate each of the solid waste facilities.
2. Promotion to increase committee members.

### Committee Members

1. Collection Systems: Sylvia Castillo, City of San Diego.
2. Transfer/Processing Facilities and Green Materials Facilities: Paul Johnson, R.W. Beck, Inc.
3. Disposal Facilities: Kevin Kondru, County of Orange Integrated Waste Management Department.
4. Jurisdictional Policy and Programs: Paul Alva, County of Los Angeles Department of Water and Power.

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## California Solid Waste Infrastructure Grading Criteria (May 2006)

Major Grouping	Category Description	Basis for Evaluation/ Criteria for Grading	Weight
<b>Disposal Facilities (30%)</b>	Condition	Condition and design of facilities. Aesthetics.	7.0%
	Capacity	Sufficient existing and long-term capacity for next 20 year period.	12.0%
	Operations	Operational compliance with regulatory standards.	7.0%
	Security and Safety	Physical security and human safety.	4.0%
<b>Processing Facilities (30%)</b>	Condition	Age and condition of facilities.	8.1%
	Capacity	Sufficient existing and long-term capacity for next 10 year period. Funding available for planned projects.	8.1%
	Operations	Regulatory compliance. Diversion efficiency.	6.9%
	Security and Safety	Physical security and environmental safety.	6.9%
<b>Collection System (10%)</b>	Condition	Age and condition of equipment and facilities.	10%
	Capacity	Sufficient existing and long-term capacity for next 10 year period. Funding available for planned projects.	
	Operations	Regulatory compliance. Bulky items removal program	
	Security and Safety	Physical security and environmental safety.	
<b>Policy and Programs (30%)</b>	Statewide Diversion	Jurisdictional compliance with AB 939 Diversion Mandates.	15%
	Landfill Gas-to-Energy	Comparative analysis of California vs. other states	7.5%
	Public Policy Initiatives	Extent California being proactive in introducing new solid waste management laws	7.5%

