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Message from CEE Affiliates

Dear Friend:

Orange County in some respects is a microcosm of our nation. We are a culturally diverse, and rapidly growing county which are getting close to being totally developed and built out. As such, our infrastructure is beginning to show its age especially in the northern and central portion of the County. Additionally, Orange County is still recovering from its financial troubles of mid 1990's and therefore needs to plan all of its infrastructure investments very carefully.

Three years ago, through the efforts of the UC Irvine CEE Affiliates and ASCE, Orange County became the first County in California to release a comprehensive Infrastructure Report Card. The report received local and national media coverage and helped focus needed attention on the condition of our infrastructure. One of the main reasons for garnering this attention was that the overall GPA for Orange County's infrastructure was a "C". This was not consistent with the overall image and high quality of life we associate with Orange County. But it conveyed a powerful message that even one of the richest and most desirable places to live in this country is not immune to the effects of deteriorating infrastructure.

Last September, we started the process of reviewing and updating the work that was done on the first Orange County Infrastructure Report Card. We were fortunate to be able to gather the same dedicated individuals whom had worked on the 2002 Report Card as well as adding new members that brought a fresh and insightful perspective to the task. The result of their hard work and dedication is the new and updated 2005 edition which was released on October 21, 2005. 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. Much work needs to be done on the local and county-wide level to improve the grades.

Over the next 20 years, Orange County is expected to grow at a rapid pace. The Orange County Business Council estimates about half a million additional residents and more than half a million new jobs will be added to the County. Orange County is also transitioning from a suburban county to an urban county. With a population of 2,846,289 (2000 census), Orange County is the second most populous county in the state of California and the fifth most populous in the United States, which makes it one of the most sought after places to work and live in the world.

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 T. Emrani, P.E.,
President
UC Irvine Civil & Environmental Engineering Affiliates

Introduction

America's and Orange County'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 our nation's infrastructure.

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.

Orange County's grades are slightly better than the nation as a whole. The National grade is a "D". Orange County received an overall grade of C+. This grade is understandable since our infrastructure is younger than the average in the nation. Even so, we see elements of our infrastructure in the older parts of the County operating past the design life and needing upgrading or replacement. In South County, infrastructure elements are 40 plus years old, and will soon need significant upgrading. It is essential that we respond now to prevent an Orange County 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.

Renewing Orange County

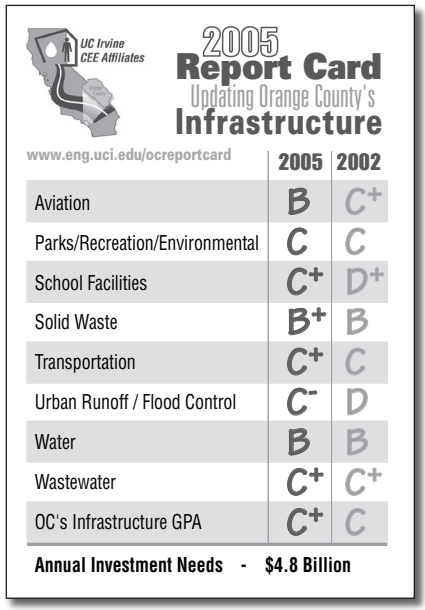
Orange County is a young region and enjoys the benefits of relatively new water, sewer, and transportation systems. Yet, even comparatively new infrastructure systems require continuous care, maintenance, and ongoing improvement. We rely upon these systems every day and their dependability and quality are silent, but significant contributors to our economic prosperity and quality of life. The Infrastructure Report Card and Citizen's Guide is designed first to engage Orange County's community leaders and then the citizenry at large in a call to action for continued, strong investment in our county's infrastructure. Never in our county's brief history has this been more important: Orange County stands poised on the brink of tremendous growth.

In addition to infrastructure within County boundaries, we must also be active in improving the regional infrastructure systems that impact our County's quality of life. The most important of these are the implementation of high speed rail systems and expansion of the power generation and distribution to serve Orange County's population by the year 2025.

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 the county's infrastructure systems. We invite you to join a growing list of concerned citizens making the case for renewing Orange County.

Grading Our Public Works

The working groups and their review committees assigned letter grades to the eight main categories of Orange County public infrastructure reviewed this year. The average grade is C+. The Report Card, reprinted on pages 6 and 7, shows how Orange County's roads, bridges, water and sewer systems measure up.



	2005	2002
Aviation	B	C+
Parks/Recreation/Environmental	C	C
School Facilities	C+	D+
Solid Waste	B+	B
Transportation	C+	C
Urban Runoff / Flood Control	C-	D
Water	B	B
Wastewater	C+	C+
OC's Infrastructure GPA	C+	C

Annual Investment Needs - $4.8 Billion

B Aviation

The aviation demand in Orange County will grow to about 37 million passengers by the Year 2025. With conversion of the El Toro Marine Corps Air Station to non-aviation facilities, the legal capacity limit for John Wayne Airport will stay at 10.8 million passengers. Therefore, our challenge is to utilize other multi-modal solutions such as high speed rail transportation to other regional airports.

C Parks / Recreation / Environmental

The growing population is placing increasing demands on our parks, natural forests, and beaches. Inadequate funding has resulted in significant degradation of parks and facilities. This makes funding, the number one challenge to PR&E when there is a competitive rivalry for dollars and resources with other mandated functions of government.

C+ School Facilities

School facilities are beginning to reflect the positive effects of the recent bond issues. The increases in enrollment appear to be leveling off, somewhat easing the capacity crunch. Deferred maintenance and upgrading of older schools continue to be a major problem.

B+ Solid Waste

The system is operated by a combination of private (collection and transfer) and County (landfills). Modern recycling is resulting in a 50% reduction in solid waste delivered to its landfills. Advanced planning is underway to extend landfill capacity through 2045.

Transportation

Orange County has achieved high standards for transportation system maintenance and improvements through Measure M. Additional progress will require high levels of investment. To continue maintaining and improving our transportation system, we need the reauthorization of Measure M.

Urban Runoff / Flood Control

A regional, watershed-based integrated planning and funding effort continues to be the policy direction that is needed to improve our flood control management, water quality, and ecosystem goals. A dedicated funding source for watershed based programs is critical.

Water

Orange County's 7900 miles of water mains and 300 potable water storage tanks will deteriorate and fail at an increasing rate. Water agencies should continue to address proactive maintenance and repairs, including corrosion prevention and seismic upgrades.

Wastewater

In 2005, more cities are using special districts' enterprise funding models and many more now have revenues dedicated to the single purpose of funding their sewer collection systems. Continued and consistent investments are required to meet the standards required by Federal and State regulations.

Understanding Infrastructure Issues

Now that you have seen Orange County's infrastructure report card, you may be asking how you can help improve our County's and cities' 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

The regional need to satisfy the growing demand for air transportation service is important to sustain both the local and regional economy and the overall quality of life of residents. The Orange County system of airport infrastructure includes the John Wayne Airport (SNA), Los Alamitos Army Airfield (SLI), and Fullerton Municipal Airport (FUL). General aviation is served by both John Wayne and Fullerton Airports. Los Alamitos serves military and government aviation exclusively. Los Alamitos Army Airfield is the home base for operations of certain units of the California National Guard and the Army Reserve. Fullerton Municipal Airport has approximately 91,000 general aviation operations annually and, along with JWA, provides the County with all general aviation facility assets.

John Wayne Airport is the most significant with respect to operations because it is the only one of the three Orange County airports that serves commercial aviation operations, although general aviation generates approximately eighty percent of John Wayne Airport's take-offs and landings.

Based on a countywide vote, the former Marine Corps Air Station El Toro is not available as a location to accommodate commercial aviation. Capacity at the John Wayne Airport is constrained by the Settlement Amendment Implementation Plan (SAIP). The SAIP will provide facilities that support the 10.8 Million Annual Passengers limit (by 2011) that was agreed to by the County, the City of Newport Beach, and two citizens' groups.

Within Orange County, demand for commercial air travel will increasingly exceed capacity, as shown in Figure 1. The Regional Aviation Plan for the 2001 Regional Transportation Plan (RTP) published by Southern California Association of Governments (SCAG) forecasts the demand for the region to be near 170 million annual passengers by the year 2025, of which 37 million will come from Orange County.

The current RTP looks to high speed regional mass surface transportation systems to under-utilized regional airport as the solution to these capacity shortfalls. The Aviation Working Group thus accepts the fact that, under present prevailing circumstances, commercial

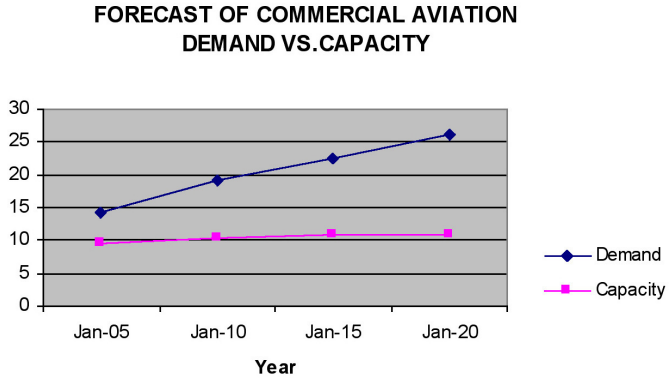


Figure 1

Demand forecast - Airport System Master Plan for John Wayne Airport and Proposed Orange County International Airport, October 2001.
Capacity forecast – Settlement Amendment Implementation Plan Program Overview, July 2005.

aviation demand by Orange County citizens will not be met with Orange County capacity. Rather, the excess demand will be provided by high speed ground transportation to regional airports, and should be considered as part of the transportation section of the infrastructure.

Consequently, there has been a change in the grading, compared to the 2002 Report Card. In this, 2005, report card, the capacity criterion for the year 2020 has been applied only to the legal limit of 10.8 million passengers, not the actual capacity need of about 25 million passengers.

The facilities at John Wayne Airport are in excellent condition, with a reported very low dollar value for the backlog of deferred maintenance. Annual expenditures for maintenance and repair are sufficient to sustain the desired facilities condition without affecting capacity. Proactive facilities maintenance management practices are in existence and have been for several years. Facility conditions at the other two Orange County airports, Fullerton Municipal Airport and Los Alamitos Army Airfield are in average condition. The Los Alamitos facility in particular is in need of maintenance and improvements to both runway and operations facilities.

All three airports are operated well within FAA standards and are in compliance with other environmental and safety standards. Of

particular note is JWA's recent record of performance on Federal Aviation Regulation Part 139 Annual Inspection. For the past four years, the Airport has not received a single non-compliance citation.

Public Policy Considerations

The main infrastructure issue related to aviation is the need to construct the high speed rail links between Orange County and the under-utilized and proposed airports in Riverside and San Bernardino Counties.

Security

John Wayne Airport was one of the first U.S. airports handling sizeable commercial passenger loads to regain pre-September 11 levels of service. JWA has, as well, been at the forefront of timely compliance with FAA and other Federal initiatives and directives for airlines and airports, post-September 11. An aggressive management approach has placed the airport in the unique position of having achieved Federal compliance for the installation of Explosive Detection Systems by December 31, 2002. This not only will enhance airport security at JWA, but also allow the commercial air traveler to move through the airport and board an aircraft with virtually no delays.

Infrastructure Funding

The cost to maintain the current grade for Aviation is estimated at $500 million over the next five years.

Parks, Recreation & Environment

Parks, Recreation & Environment (PR&E) is an integral part of the region's infrastructure. There is a growing body of science, public awareness, and knowledge showing the positive effect of PR&E on the social, economic and physical health and wellbeing of the populace. Dr. Richard J. Jackson, recent California Public Health Officer, states "We humans work and live better when we have the opportunity to play, run around, have fun and be outdoors. This simple lesson should underscore the way we plan and inhabit our environments."

Though most people consider themselves conservationists, the need for current and future financing to preserve and protect these essential resources exceeds current funding levels and is growing. Fortunately, plans for new State and County financing measures are being discussed. The proposal for a California Clean Water, Clean Air, Safe Neighborhood Parks and Coastal Protection Act of 2006 begins by stating, "California continues to face a huge unmet need for safe parks and playgrounds. As our population grows, we need to set aside space and provide the funds for State and local park development and restoration. The proposed Park Bond is designed to meet the needs of California's growing population which is expected to increase by 25 million people by 2040." In Orange County, the second most densely populated county in California, the population is expected to increase by 500,000 by 2030.

There are significant changes in the use of the parks and recreation facilities in Orange County. These ongoing changes affect all the four categories used to evaluate this element of Orange County's infrastructure. The most important are:

- There are changing uses of public park facilities from passive to active resulting in greater wear and tear.
- Growing populations and expanding urban development are increasing pressures on forest reserves.
- Open space areas that support large stands of native habitat have been adversely affected by human actions. Uncontrolled overuse of open space areas have resulted in direct impacts to sensitive habitats. Indirect impacts, including the spread of exotic plant

and wildlife species, have compromised natural ecosystems throughout the County.

- The County system was instituted in 1963 through the County Master Plan for Regional Parks, and there are 10 times more visits now, which exceed current capacity. Visitation is expected to double in another 10 years, and if we do nothing to increase capacity, there will be dramatic impacts and overuse.
- On the seven major holidays each year hundreds of people are lined up to get into each of the developed regional parks. By way of example, Carbon Canyon and Irvine Regional Parks are closed on major holidays because of overcrowding and access problems
- Current funding for Operations and Maintenance hasn't kept pace with use of public facilities resulting in degradation of parks and facilities.
- Many cities have inadequate planning for parks and recreation needs.
- There is a lack of inter-jurisdictional planning.
- There is a need for planning because of: growing population; changes in population demographics and cultural preferences; fewer backyards; desire to get away from urban environments; and need for education.

There is a need to work collaboratively in the Orange County region to enable Parks, Recreation and the Environment to have a significant voice in government prioritization and funding proportionate to the irrefutable quality of life and economic impact contributions they make. With a broad array of jurisdictions, the collaborative leadership in this regard has been limited. The recommendations from the 2002 PR&E Report Working Group were largely unfulfilled primarily because there has been no planned opportunity, nor lobbied obligation, for follow-up to that report.

The second 2002 recommendation was "to formulate policies within the next year, 2003, at the County and municipal levels that will elevate PR&E as 'infrastructure' in the budget process." What we see in 2005 is a continuing lack of high priority funding for PR&E due to extreme pressures for funds for transportation, meeting water quality regulations, personnel costs and state as well as county diversions.

The third 2002 recommendation was "to formulate a citizen committee to develop solutions for achieving the goals, strengthen the PLANNING process for the future and monitor political decisions that may affect the execution of the PLAN." In 2005 we see very little progress in this regard, largely due to financial and staffing constraints of the cities and County and no other obvious leadership for such a process.

Public Policy Considerations

- Formulate a citizen committee to develop solutions for achieving the goals and strengthen the planning process for the future.
- Advocate at the State level for an adequate and consistent income stream.
- Formulate policies at the County and municipal levels which will elevate PR&E as critical "Infrastructure" in the budget process.
- Work toward collaborative planning throughout Orange County.
- Support and enhance existing educational opportunities such as local nature centers and outdoor education programs.

Security

Security issues were considered not applicable to Parks, Recreation, & Environment.

Infrastructure Funding

The funds that are needed for improving the PR&E's grade to a grade of "B" are currently estimated at over $ 2 billion. These costs include acquisition of new park land, capital improvement projects, as well as operations and maintenance. It should be noted however, that these costs do not include any capital improvement programs, or operations and maintenance at the city or state level.

School Facilities

The School Facilities Working Group's investigation found that Orange County school infrastructure has improved over the last three years. Deferred maintenance areas reported in 2002 have been at least partially mitigated, and capital facilities construction along with stabilized or decreasing enrollment in the majority of districts, has enabled districts to better house and accommodate the needs of their students.

The credit for this improvement goes largely to the districts and their constituents. While districts county-wide have aggressively pursued a wide range of financing sources, including State and local bond monies, developer fees, and private financing, the success of local bond measures over the last several years has substantially enhanced the districts' ability to safely and effectively house and educate their student populations. The success of these bond measures bears witness to the importance Orange County residents in general place on the safety and educational quality offered to the County's children. In addition, state voter-approved modernization funds have been available for qualifying districts

Unfortunately, not all districts have been successful in increasing their financial capacity; failed local bond issues and the consequent inability to provide matching funds for State aid has resulted in continued infrastructure deterioration in these districts. Moreover, there is still much work to be done countywide, even in those districts that have successfully floated bonds and captured available State aid, to bring Orange County school infrastructure to a level of excellence. The following case studies graphically demonstrate the ongoing need for physical and programmatic improvements to Orange County's school infrastructure.

Case Study #1
Fullerton School District

The Fullerton School District operates twenty schools with 14,000 students in grades K – 8 in Fullerton. In the 1960s the District experienced rapid enrollment growth and construction of new schools, subsequent enrollment declines, and new enrollment growth beginning in the mid-1980s.

From 1998 through 2000, with continuing growth in student population putting pressure on its aging schools, accompanied by aging infrastructure generating major maintenance needs, the District began assessing its infrastructure and new construction needs. In 2002 the District's new Strategic Plan gave a high priority to the health and safety needs of District children, as well as to the goal of infusing state-of-the-art technology through the instructional program.

With strong community support, local general obligation bond Measure CC passed in 2002. The District also applied for and obtained State modernization and new construction funds. These combined funding sources have resulted in various types of infrastructure upgrades in all schools, such as replacement of underground utilities and roofs, renovation of student restrooms, and improvement and expansion of technological access for wireless Internet access. Additional facilities were added, including a new school, along with new multipurpose rooms and a gymnasium at existing schools. The District's Measure CC projects should be completed by 2008.

Case Study #2
Huntington Beach Union High School District

The Huntington Beach Union High School District operates nine schools with over 15,000 students in grades 9 – 12 in Huntington Beach, Fountain Valley and Westminster. In the 1960s and 1970s the District experienced rapid enrollment growth and construction of new schools.

In the 2002 Orange County Infrastructure Report Card, all high schools in the Huntington Beach Union High School District were reported to be in desperate need of repair. Every school in the District faced critical repair needs that would only worsen if neglected. Existing infrastructure conditions included: aging schools in need of major repairs, leaking roofs causing damage to computers and furniture, and sinking buildings where walls and ceilings had separated from supporting pillars.

The Strategic Plan 2002-07 committed that "…all District facilities will be safe, modern, clean and welcoming with sufficient capacity so that they are conducive to learning and working." In 2004 the voters in Huntington Beach, Fountain Valley and Westminster passed Measure C, which provided some of the much-needed funds to improve conditions at the District's nine schools. The District's current Facilities Master Plan details construction through 2009.

The two case studies presented above represent current efforts to upgrade infrastructure conditions in districts that passed local general obligation bonds and accessed State bond construction funds. Other school districts that passed local general obligation bonds since 1998 have infrastructure and new construction upgrades completed or well underway. School districts that have not passed local general obligation bonds or are unable to access State bond construction funds are likely to be unable to significantly upgrade their infrastructure. Orange Unified School District is a good case in point.

Case Study #3
Orange Unified School District

Orange Unified School District has submitted to local voters two general obligation bonds, the most recent the Orange Unified School District Repair and Facility Improvement Bond of 2004, Measure A. Both bond measures failed to get sufficient voter approval, with the most recent receiving a 54.1% voter approval against a minimum required 55%. The Orange County Business Council recommended support of Measure A, which would have authorized up to $196 million to modernize and expand existing facilities. With more than half of Orange Unified School District schools over 40 years old, funds from the passage of Measure A would have assisted the District in applying for State Proposition 55 funds, and thus move forward with modernizing District schools.

As referenced, some Orange County K- 12 districts have received, in aggregate, over $423 million in State modernization funds from Proposition 47 (2002) and Proposition 55 (2004) to assist with improving Orange County K – 12 schools. However, without the critical element of local funding, as in the case of Orange Unified, major work beyond basic maintenance of existing conditions is nearly impossible.

Findings

Orange County's school infrastructure was assessed from four perspectives: (1) condition; (2) capacity; (3) cost; and (4) maintenance and operations. Additionally, the status of security at Orange County schools was generally assessed; however, because of the sensitive nature of such security issues, the Working Group has evaluated security on a strictly "pass-fail" basis.

Overall, the Working Group has found that Orange County school infrastructure has improved in the categories listed above. School facility conditions have improved through successful school facility financing measures; capacity has improved as once-burgeoning enrollments have begun to level out and, in some cases, shrink; a number of new schools have been constructed to meet increased enrollment and the commitment to provide resources to annually assess the condition of facilities has increased. Funding for maintenance and operations, however, has stayed fairly level, resulting in a fairly high level of deferred maintenance. School facility bond monies may only be spent for certain types of capital projects, and cannot be used for routine maintenance and operations expenses. However, K – 12 school districts that have obtained State school facility bond funds from Proposition 1A (1988), Proposition 47 (2002) and Proposition 55 (2004) are required to spend three percent (3%) of their annual General Fund budget on routine maintenance for twenty (20) years, and this State requirement should help maintain school buildings over the years.

Most school districts have faced growing enrollment for the last two decades. In 1996 and 1997, many school districts serving elementary students adopted class-size reduction programs for some or all of grades K – 3. The smaller number of students in each classroom yields a smaller student-teacher ratio, providing better opportunities for teachers to address individual student needs and provide an increased quality of teaching. However, when school districts are concurrently experiencing student population growth, as was the case in 1996-97, this growth, coupled with decrease in student class sizes, resulted in a greater demand for classrooms.

The demand for classroom space has been satisfied in various ways, primarily through construction of new school facilities if funding permitted; leasing and/or purchasing modular classrooms if time and/or funding for new schools were not available; and changing to year-round schools.

Beginning in 2003, student enrollment increases have begun to taper off in a number of school districts, and school districts that serve K – 6 students have begun to experience enrollment declines at those grade levels, primarily in North Orange County. School districts serving high school students are anticipated to see enrollment declines

beginning in the next two to four years as the "bubble" of students from the elementary schools leave the high schools. Indeed, the majority of the School Districts surveyed indicated they would have adequate capacity to house anticipated enrollment over the next ten to twenty year planning horizon, based on current enrollment trends and projected new construction and modernization projects.

Public Policy Considerations

The key issues to consider are:

- Continue to improve the financing of maintenance, to remove the existing approximate $300 million in deferred maintenance;
- Develop programs and financing mechanisms to meet increasing legal/regulatory requirements for accessibility, safety, and quality educational programming.
- Regional education of the general public as to existing school conditions, the mechanics of school district financing, and the need for additional funding to bring school infrastructure to a level of excellence.

Security

District administrators have generally ranked security measures as "satisfactory", even though isolated security incidents may have occurred at various schools. Approximately 70% of the School Districts reported their facilities meeting all security requirements.

Infrastructure Funding

The School Districts estimate the cost of deferred facilities maintenance at approximately $147 million, and spend over $24 million in routine maintenance of their schools. Given that roughly half of the county's school districts responded to the survey, the actual dollar value of deferred facilities maintenance within County school districts is probably over $300 million. It is further estimated that over $ 1 billion dollars is needed to bring the School Facilities grade to a "B".

Solid Waste

Orange County's solid waste collection, processing and disposal has come a long way in the past quarter century. The County's method of solid waste management involves three distinct layers. First is collection of residential, commercial, and industrial waste. Second is processing of the waste to remove recyclable materials. Third is disposal of the residual waste into the County's three landfills. The first two layers are performed by private industry under contract or franchise with the cities or sanitation districts, while the third layer is performed by the County of Orange. It may be argued that a fourth layer could be added – the planning and managing for the future of solid waste disposal within Orange County.

In 2004, Orange County's waste disposal was seven pounds per day per person, or enough waste to fill a major league stadium every five months. According to the U. S. Census Bureau, the population of Orange County is 3 million, with a projected population of 4.5-million by 2025, a 50 percent increase. These population numbers, coupled with a high rate of development, point out that research, planning and development of new solid waste disposal methodologies will become even more critical as the population increases. Orange County's three existing landfills have a combined remaining life of 25 years. Orange County's Integrated Waste Management Department is doing advanced planning to extend the landfills' remaining life to approximately 40 years.

Today, 75 percent of waste generated from residential, commercial, construction or demolition sources is transported to one of six Material Recovery Facilities (MRFs), where recyclable materials are removed through a semi-automated process. The remaining 25 percent of collected waste is transported directly to the County's landfills.

Orange County's waste collection vehicles are modern and well maintained, with sufficient backup to handle today's demands. The six MRFs are located in north and central Orange County; there are none in south Orange County where the population is growing rapidly.

Many of these MRFs are surrounded by development, causing additional concern over issues such as noise and odor. Residual waste from the

MRFs is transported to the landfills by specially designed high-volume transport trucks. Once at the landfill, waste is placed in a series of layers within a controlled environment that includes non-permeable liners, covers, gas collection systems and groundwater monitors. The County's landfill gas collection systems generate enough electricity to power approximately 10,000 homes.

Recycling has contributed substantially to the reduction of residual waste delivered to the County's landfills. It is estimated that recycling accounts for approximately 50 percent of the reduction in solid waste delivered to County landfills over the last ten years. This number is expected to grow as the cost to dispose becomes more expensive than the cost to recycle, leading to the development of more processing facilities.

Household hazardous waste is prohibited from landfill disposal. To encourage proper handling and management of household hazardous waste, the County operates four regional drop-off centers strategically located throughout the County. In addition, landfill waste loads are periodically checked to remove any hazardous waste that is found with the municipal refuse.

Funding for the management, development and processing of solid waste in Orange County is accomplished through user fees. Sale of electricity generated from the landfill gas is also a minor source of revenue for the solid waste disposal system. These user fees and revenues allow for planning, research and development of disposal resources.

Public Policy Considerations

Public debate is ongoing over the location and use of Orange County's publicly owned landfills, and privately operated processing facilities and transfer stations. In addition, with the Orange County bankruptcy in the 1990's, public policy was established allowing adjacent counties to dispose of their solid waste in Orange

County's landfills for a fee. Even though County landfills have a combined remaining life of approximately 25 years, public policy allowing other counties access to our landfills has been controversial. Advanced planning is underway to extend the landfills' remaining life to approximately 40 years.

- Continue monitoring emerging technologies for potential implementation as an alternative to landfills
- Support development of additional waste processing facilities to divert reusable resources from landfills.
- Continue planning and permitting to maximize existing landfill capacity.
- Continue educating consumers, with the goal of reducing production and consumption of unnecessary goods, packaging and throwaways.
- Continue educating consumers on the value of recycling and the proper disposal of hazardous waste.

Security

Security issues were considered not applicable to Solid Waste.

Infrastructure Funding

The cost to maintain the current "B+" grade of the solid waste system (including collection, processing, and disposal) is estimated at $530 million per year.

Transportation

The transportation infrastructure provides for the safe and efficient movement of people and goods. For all areas of development, a community is known and valued by its transportation system, either how bad or effective it is. Orange County has achieved high standards for transportation system maintenance and improvements but will require high levels of continued investment to maintain this standard. The Transportation infrastructure has three components that were evaluated in arriving at a combined grade: Highways, Transit, and Bridges.

Highways

Orange County, through OCTA, initiated a Countywide Pavement Condition Assessment Study in 2005, which builds upon the previous 1998 countywide assessment study that produced an overall pavement condition rating system, convertible to a grading system. Currently, almost all agencies have adopted the 100 point scale, the Pavement Condition Index (PCI), and made considerable progress in standardizing their annual reports to OCTA. The 2005 study is based on pavement condition data collected from all city agencies in Orange County (34) and the County of Orange.

The Arterial Highway Rehabilitation Program (AHRP) provides a significant incentive (50 percent funding match) for local agencies to develop rehabilitation projects. In addition, Measure M established a local maintenance of effort (MOE) that requires minimum expenditures for construction and maintenance programs. These funding and MOE programs improve the overall grade.

According to the draft Countywide Assessment of Existing and Future Pavement Needs (June 2005), the pavement condition of more than two-thirds (69 percent) of Orange County's streets (arterials/collectors and local streets) is considered to be in fair or better condition, with 48 percent of the streets rated at good or very good. However, when compared to 1998, the average condition has declined by 7 percent from 81 in 1998 to 75 in 2005. The overall PCI grade for the County Arterial Highways condition is the average of two grades: 75.8 for Arterials/Collectors and 74.7 for Local Streets. Note that not all agencies responded to the surveys in 1998 (only 16). The 2005 data are much more

accurate. Nonetheless, there is a clear trend that pavement conditions have gradually deteriorated since 1998. The cost to maintain the current pavement condition on arterial and local street facilities is approximately $79 million per year or $1.18 billion over a 15-year period. The cost to raise the grade by one level over the current pavement condition on arterial and local street facilities is approximately $111 million per year or $1.67 billion over a 15-year period.

The pavement inventory under Caltrans jurisdiction in Orange County has 279 centerline-miles (2 percent of State total), of which 140 miles are freeway miles, 51 miles are toll miles, and 88 miles are conventional miles. The total lane-miles for the district is 1,904 lane-miles (4 percent of State total), of which 1,082 miles are mixed-flow, 214 miles are high-occupancy vehicle (HOV), 286 miles are toll, and 322 miles are conventional miles. The combined cost to maintain the pavement portion has been approximately $10,000 per lane per year. Orange County has one of the highest densities of average daily traffic (ADT) in the country. (ADT for Interstate 405 [I-405] at the junction of SR-22 in Seal Beach is 380,000 vehicles per day).

To maintain the facilities from right-of-way border to right-of-way border, the current routine maintenance cost is approximately $17,200 per lane per year, which includes pavement, crack sealing, and patching work. This cost does not include the pavement rehabilitation/preservation works. The future cost would be approximately $20,000 (20 percent increase) for maintaining the facilities within the right-of-way, excluding the pavement rehabilitation/preservation efforts.

Capacity of the future highway system considers future growth in population and employment and a committed highway system consistent with OCTA's Draft Long-Range Transportation Plan. Only those projects programmed for funding within a seven to ten year time frame are assumed. This represents a conservative analysis approach and underscores the need for continued County resources similar to Measure M.

Operations of the existing highway system were rated based on existing traffic demand relative to available capacity. This category is a direct evaluation and measure of the benefits received through the Measure M freeway and arterial capacity improvements during the last 10 years.

Transit

The overall condition of the Orange County transit system is based on a qualitative assessment of customer perception based on recent data collected by OCTA. In 2001, bus passengers completed a comprehensive survey of the Orange County bus system. While customers gave the Orange County bus system high marks for the overall system, reliable equipment, and printed and on-line information resources, some customers identified room for improvement in the areas of frequency of bus service, phone information, and route information at bus stops.

In response to the 2001 survey, all OCTA bus stops now have route, time schedule, phone number, and Web site address information. Also, 2001 transit service hours have increased by over 340,000 in the last four years, an increase of 23.2 percent. New bus routes have been added in several areas, including four Night Owl Service routes (24-hour bus service).

Additionally, in recognition of OCTA's excellent transportation service, the American Public Transportation Association has named OCTA as the No. 1 transportation system in America.

The evaluation of capacity focused on measuring the effectiveness and utilization of the current system. The specific effectiveness measure describes how many passengers per hour use public transit.

The evaluation of operations focused on measuring the efficiency of current operations. The specific efficiency measure, boardings per dollar of operating expense, indicates how much ridership is produced for each dollar invested in operating the bus system. To quantify Orange County's standing for this measure compared to similar agencies throughout the United States, OCTA reviewed population, service area, and fleet size data from the nation's transit agencies. This analysis led to the selection of Cleveland, Dallas, Minneapolis, Portland, San Diego, and San Jose as a reasonable peer group for comparison purposes.

Metrolink

There are two segments of a commuter rail infrastructure in Orange County:

1. An east-west corridor owned by the Burlington-Northern Santa Fe (BNSF) Railway extends from Buena Park, Fullerton, Placentia, Yorba Linda, and the Santa Ana River Canyon toward Corona. It is mostly

two main tracks, with segments of a third track in Fullerton and in the canyon; except for local curve restrictions, it is mostly 65 and 79 miles per hour (mph) rated track.

2. OCTA owns former Santa Fe Railway lines, which join the BNSF at Fullerton and extend southeast through Anaheim, Orange, Santa Ana, and Irvine to San Clemente and connects with tracks to San Diego and a five-mile connection between Orange and the BNSF line at Atwood, about three miles east of Placentia. Approximately 60 percent of this route is two tracks, and all tracks are rated at 60 to 90 mph as above.

The OCTA lines are in a good to excellent state of maintenance and are supported by robust rehabilitation budgets. There are a few local vulnerabilities to storm damage (along the beach at San Clemente, at 4th Street in Santa Ana, and some hillside erosion in El Toro).

The BNSF lines are in average to very good state of maintenance. They are subject to very high levels of freight traffic and thus experience more rapid wear of track components than the OCTA segments. Some vulnerabilities are generally older and more worn rail, a smaller percentage of concrete ties, and some deteriorated road-crossing surfaces.

The OCTA and BNSF lines operate at approximately 90 percent on-time (expressed as within five minutes of arrival time at last station). Exceptions to on-time performance are freight train congestion (discussed below), occasional accidental or criminal (i.e., suicide) incidents, and occasional signal and communication system failures. There have been two train-to-train collisions in the last 10 years that could have been forestalled by installation of a more-sophisticated train control system; however, adoption of this sort of technology must be done on a nationwide basis and is not within the authority or financial resources of local agencies.

The BNSF segment is at or over capacity on peak days. Rail traffic fluctuates weekly, with five working days of commuter traffic and variations in ship arrivals/departures that affect merchandise container shipments. On weekdays, there are 28 weekday-only Metrolink commuter trains, 24 daily (7-day) Amtrak intercity trains, and 40–55 BNSF freight trains. Projected growth in both passenger and freight traffic is driving the BNSF and Caltrans Division of Rail to fund incremental expansion of third main track segments. Traffic analyses for this line indicate an annual growth rate of 6–8 percent, which will

double freight traffic within two decades (driven by port traffic and diversion from highways).

The OCTA segment has capacity to add some more passenger trains between Fullerton and Laguna Niguel, upon the completion of a two-mile segment of second track in Santa Ana. Increased freight traffic is constrained by infrastructure limitations in San Diego. Increased through-passenger traffic (i.e., Los Angeles to San Diego) is constrained by limitations on the BNSF west of Fullerton and by the single-track segments south of Laguna Niguel. There are political pressures that limit expansion of capacity south of Laguna Niguel; the expansion of the BNSF lines to three and four tracks is being driven by freight traffic as discussed above. Rating: B (able to sustain 2010 and probably 2020 traffic locally but constrained in its function as an interregional corridor).

Bridges

In California, the Department of Transportation (Caltrans) developed the California Bridge Health Index to judge the performance of its bridge maintenance and rehabilitation efforts. The Index includes all structures that are assigned a bridge number (e.g., overcrossings, undercrossings, overpasses, pedestrian overcrossings) within the State of California right-of-way. In Orange County, there are approximately 636 bridges in the Caltrans District 12 (Orange County) inventory.

The Bridge Health Index is a 0–100 numerical rating that utilizes inspection data to determine the remaining asset value of a bridge or network of bridges. The Health Index (HI) operates on the premise that each element on a bridge has an initial asset value when the element is in new condition. Over time, an element may deteriorate to a lower condition, resulting in a reduction in the asset value of the element. When maintenance or rehabilitation actions are performed, the condition of the element will likely improve, and the corresponding asset value of the element will be increased. At any point in time, the current element condition can be ascertained by field inspection or predicted for future years using a deterioration model. Once the condition is known, the current element value can be determined for all elements on the bridge. The HI for the bridge is the ratio of the current element value to the initial element value of all elements on the bridge.

Public Policy Considerations

During the latter part of the 20th century, Orange County's transportation system had been neglected. Frustrated with a lack of transportation choices and efficient movement of peoples and goods, voters in November 1990 approved Measure M, the one-half cent sales tax for countywide transportation improvements. Measure M will have generated approximately $3.1 billion over its 20 year lifespan to create a balanced multimodal transportation system and provide near-term relief on existing freeways, streets, and roads.

For the past 15 years, the citizens of Orange County have seen vast improvements to their freeways as well as to their streets and roads. The centerpiece of the Measure M program was the widening and reconstruction of Interstate 5 (I-5). Additional improvements were made to the Orange Freeway (SR 57), Riverside Freeway (SR-91), and the Costa Mesa Freeway (SR-55); improvements to the Garden Grove Freeway (SR-22) are currently underway. Additionally, the nation's fastest growing commuter rail system, Metrolink, was created to serve over 2.6 million riders annually on the Orange County lines alone.

If the Orange County Report Card had been issued 15 years ago, the overall County grade would undoubtedly have been a failing grade. Today, with over 15 years of Measure M improvements, the condition, operation, and capacity of our transportation system has improved greatly and receives an overall grade of C+.

There is still much work to be done and to continue maintaining and improving its transportation infrastructure, Orange County needs a continuous source of funding similar to Measure M. Without a continuing source of funds for transportation improvements, there will be a tremendous depreciation of transportation assets, i.e., a reversion to pre Measure M years. Additionally, there is a good chance that with increased population in Orange County, gridlock will set in on the roads, highways, bridges, and transit system.

Goods Movement

Perhaps the most pressing issue for the Southern California region and Orange County is to accommodate the anticipated increase in demand for goods movement in the region. As a region, the five Southern California county transportation commissions (LACMTA, OCTA, SANBAG, RCTC, and VCTC), four Southern California Caltrans

districts, and SCAG are funding the "Southern California Multi-County Goods Movement Action Plan." This Goods Movement Action Plan is an 18-month study undertaken by a consultant who will look at goods movement issues and strategies for the region as a whole and for each individual county.

In parallel, Caltrans is developing its own goods movement action plan for the State of California. In the current draft of Caltrans Goods Movement Action Plan, OCTA and Caltrans District 12 have submitted 13 projects for at least $1.2 billion in proposed short-, mid-, and long-term projects.

Security

The agencies responsible for transportation security in the Orange County region have recently formed a Regional Transit Security Working Group to address issues regarding the safety and security of the traveling public and movement of goods. This group includes the Los Angeles Metropolitan Transit Authority (LAMTA), SCRRA/ Metrolink, and OCTA. These agencies are working on a regional approach to project planning that will harden likely terrorist targets and refine the response plans critical to infrastructure needs.

The OCTA and Metrolink recently had individual security system audits conducted by a FTA-sanctioned consultant who evaluated each system and recommended methods to handle future potential threats. These recommendations will become the basis of a blueprint when planning for future regional and local area system security enhancements.

Infrastructure Funding

The Orange County Long Range Transportation Plan (LRTP) provides transportation strategies to support Orange County's growing and changing population, employment, and housing trends. As of the last LRTP, an investment of $33.2 billion in our transportation system would be required to raise our grade by one level. This amount is approximately $9 billion more than the $24.3 billion that was identified in the financially constrained portion of the 2002 LRTP for funding transportation improvements. Of the $24.3 billion investment, OCTA revenues account for 65 percent of the total. The balance of revenues is from Caltrans, the Federal Highway Administration and Federal Transit Administration discretionary funds, Transportation Corridor Agencies, local jurisdictions, and private sources. There will be new projected funding amounts in the 2006 LRTP.

Urban Runoff/Flood Control

Urban runoff continues to be one of the greatest challenges that local governments struggle to resolve, yet it remains relatively under the radar of the general public and, perhaps, many of our locally elected officials.

Orange County has one of the most aggressive storm water programs in the nation while being forced to comply with some of the most stringent recreational water quality standards. While our two National Pollution Discharge Elimination System (NPDES) regulatory permits have required local governments to take a more innovative and proactive role in combating water quality pollution, we must acknowledge that only so much improvement can be realized through designing and implementing new structural best management practices. In fact, improved infrastructure must be combined with a more forensic approach in making the public aware of this issue and how their individual social behavior directly impacts our local water quality.

Many have previously stated that the 1999 Huntington Beach closures and postings brought the urban runoff issue to the public's attention. However, in August 2003 we discovered, through a comprehensive public survey of 1,500 Orange County residents, that not only is the public generally unaware of what the term urban runoff means, but it also had little knowledge that the sanitary sewer system and the storm sewer system were two separate infrastructure systems with two entirely different forms of treatment. The sanitary sewer system receives treatment before being discharged into the ocean, while the storm sewer system empties directly into the ocean without the benefit of removing any contaminants and pollution. However, this survey focused on very specific questions related to urban runoff. A more high recent survey conducted by the Orange County Transportation Authority (OCTA) revealed that water quality issues actually attracted a high level of attention with Orange County residents. The Orange County Coastkeeper and other non-governmental agencies also recently commissioned a poll in early 2005 that also revealed that overall Orange County residents are very much aware of water quality issues; in their poll, water quality issues outranked crime.

As we identified in the 2002 ASCE Infrastructure Report Card, urban runoff originates in every neighborhood throughout the County and heads directly to our beaches and waterways through our flood control channels. Although Orange County can boast a long and effective history of designing and building flood control infrastructure, it currently struggles to adequately address the growing need to maintain this aging infrastructure, with special attention to the fact that the flood control system is the primary conduit for urban runoff.

With more than 300 miles of regional flood control channels in Orange County, flood control engineers and planners have a unique opportunity to maintain this infrastructure while providing a benefit to water quality. However, to accomplish this they must change the way they have approached their jobs for decades, that of protecting both life and property, and embrace the fact that a multi-purpose approach to projects can have multiple benefits, such as providing for flood control protection and operations while balancing ecosystem issues such as habitat restoration and water quality requirements.

In addition, both the general public and the regulatory community must also be encouraged to accept and promote the need to balance water quality, habitat and ecosystem restoration and flood control issues. The public prefers scenic and heavily vegetated flood control waterways in lieu of concrete channels. However, when the need for flood capacity demands the removal of some vegetation, it becomes extremely difficult to win approval from our regulatory agencies as well as the general public.

The good news is that some data suggest that the countywide efforts to help improve the health of our watersheds are actually beginning to reveal a healthier coastline. Since 2002, fewer beach postings have been reported, allowing us to improve the number of beach mile-days our local beaches remain open. While Orange County continues to wrestle with these two immediate and interrelated issues, we must continue to do more with less in a more diligent and calculated manner to protect our local economy as well as the quality of life we have come to expect for all who live, work and play here.

Public Policy Considerations

A regional, watershed-based integrated planning and funding effort continues to be the policy direction that is needed to improve our flood control management, water quality and ecosystem goals. Although progress has been made in this direction, the County and other special districts and cities must continue to make this a top priority. An adequate, equitable and dedicated funding source for watershed-based programs that would fund not only capital but also operations and maintenance is needed. Currently, water quality is funded through a mish-mash of means. With more than $80 million being spent countywide each year, 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 Urban Runoff and Flood Control program:

Regional Planning

- Develop and implement watershed-based stormwater programs that can integrate multi-objectives such as ecosystem restoration, flood control requirements and water quality.
- Develop an adequate, equitable, and dedicated funding source for the watershed-based program that would fund capital construction projects, and operations and maintenance requirements.
- Develop and implement a multi-objective management approach for flood control systems that includes increased flood protection, ecosystem restoration, and water quality objectives
- 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 improvements.

Security

In response to the President's Homeland Security mission, the County of Orange, Resources and Development Management Department, has taken meaningful and appropriate actions to inventory and identify appropriate infrastructure for its level of preparedness in any major event. Subsequent response plans have been prepared in order to quickly and effectively prepare for and take action in any type of emergency.

The Orange County Operational Area Executive Board created a written plan that is now a part of the Orange County Operational Area Emergency Plan, "Weapons of Mass Destruction, Consequence Management, August 2002, Revised" that will be used to respond to terrorism that involves instruments that provide crisis management and consequence management. "Crisis management" refers to measures to identify, acquire, and plan the use of resources needed to anticipate, prevent, and/or resolve a threat or act of terrorism. Crisis management is predominantly a law enforcement response. "Consequence management" refers to measures to protect public health and safety, restore essential government services, and provide emergency relief to governments, businesses and individuals affected by the consequences of terrorism.

Infrastructure Funding

Based on latest bid abstract compiled from the list of the most recently built OCFCD flood control construction projects, $1.3 billion dollars is needed to achieve countywide 100-year flood capacity within all current OCFCD facilities. Additionally, the cost to maintain the existing stormwater system in its current condition is approximately $80 M per year.

Water

Orange County has nearly 7900 miles of water mains and 300 potable water storage tanks. We use 228 billion gallons of water each year. The County has two major water use areas. North and central Orange County depend on a combination of groundwater pumped from the Santa Ana River, and water imported from the Colorado River and Northern California. Orange County depends almost entirely on the imported water.

Our water infrastructure received an overall grade of B. The infrastructure is in good or excellent condition, but will increasingly require investment for repair or replacements. Also, since the 2002 Report Card, we have identified several areas of risk that will have to be dealt with in the coming few years to maintain the "B" grade. These include quality of State Water Project water, subject to the CalFed Program and newly-determined local contaminants (e.g. MTBE, perchlorate) in the Santa Ana River groundwater basin.

Public Policy Considerations

In 2005 and beyond, Orange County needs to continue to focus on several aspects of water infrastructure to prevent any slippage of the grades:

Aging Facilities

Though much of our water infrastructure was built within the last 40 years, it will deteriorate and fail at an increasing rate. Water agencies should continue to address proactive maintenance and repairs, including corrosion prevention. The Groundwater Replenishment System (GRS) currently under construction, will go far to improve the seawater intrusion barrier system, as well as adding water to the spreading ground in the Santa Ana River area.

Water Supply

Local groundwater and imported water supplies are both at risk from water rights reallocations and contamination. California has been cut back from the surplus Colorado River water it has enjoyed until now. New supplies are under development, such as GRS above. Agricultural water conservation, ocean water desalination and increased water use efficiency are possible ways to address the water supply problem.

Water Quality

The Grade of "B" reflects well on the water retailers in the County. However, nearly everyone interviewed this time around as they did three years ago, expressed concern about possible contaminants in both imported and local water sources. The Metropolitan Water District (MWD) needs to continue to seek water quality improvements through the CalFed process. As new contaminants are identified, the cost to provide safe water will increase.

System Reliability

Portions of Orange County depend heavily on imported water that is delivered through two major pipelines and one regional filtration plant. Since the 2002 report, a study has been completed (through the Bureau of Reclamation and the Municipal Water District of Orange County, in conjunction with local retail agencies in South County) which lists options for improving system reliability. These include: additional local and regional water storage in South County, additional local interconnections and looping major feeder lines, a seawater desalter project, a large filtration plant and tunnel project by MWD, and others. These reliability projects should be implemented in a timely manner.

Seismic Retrofit

Although a recommendation to do so was offered in 2002, few agencies have yet to conduct comprehensive seismic surveys to determine if their facilities meet today's seismic standards. Water supply is critical in the aftermath of a major earthquake. The integrity of water infrastructure systems must be protected from failure in seismic events.

Security

Security of many public facilities, including water systems, has received increased attention. Water agencies were required under Federal statute to complete a confidential vulnerability assessment in 2002 or 2003. Agencies surveyed had identified improvements and have either implemented or begun implementing the suggested improvements. A number of agencies in Orange County are seeking funds from Federal and State sources (such as voter-approved Proposition 50, which included a specific security enhancement chapter) to help pay for additional security improvements.

Infrastructure Funding

Orange County will need to invest 1.9 billion over the next ten years to maintain a B grade in water infrastructure.

Wastewater

Well managed and funded wastewater collection and treatment systems are essential to the vision of sustaining the quality of life and economic vitality of Orange County, protecting the public health and the environment and extending the useful life of the infrastructure. Recent events in the Gulf Coast due to Hurricane Katrina and Hurricane Rita and their devastating effects on infrastructure and the resulting societal and environmental impacts make these themes even more significant.

In 2005, more cities are using special districts enterprise funding models and many more now have revenues dedicated to the single purpose of funding their sewer collection systems. Even so, the most stressed element of our wastewater system is the pipeline collection system. Many sewer systems in Orange County, particularly in older cities, have reached their design life. As their condition deteriorates, older sewers are more prone to root intrusion, offset joints, debris, grease build-up, and site-specific failures that can cause sewer spills. Pumping systems can have performance problems caused by corrosion, mechanical wear, and equipment obsolescence.

Wastewater reclamation and treatment facilities as a whole are faring better than sewage collection systems. There are two main reasons for this:

- Treatment facilities have historically received greater attention than collection systems, as they have been operated under the EPA Clean Water Act and National Pollutant Discharge Elimination System (NPDES) permits for many years. These Federal regulations require treatment plants to meet certain effluent discharge levels, staffing levels, operator training and certification, and operating and maintenance management program criteria. This has resulted in paying close attention to maintaining these systems. Treatment facilities' long range planning and performances continually meet or exceed water quality standards. Regional authorities serving the north and central Orange County have committed to full secondary treatment and are planning and constructing the needed facilities. In addition, further disinfection of this treated wastewater, discharged offshore to the ocean, has eliminated concerns about the effects of treated wastewater on our harbors and beaches.

- Collection systems, including their pumping facilities, however, have not been regulated in a similar fashion. In parts of Orange County, the trend is shifting. In April 2002, the Santa Ana Regional Water Quality Control Board (RWQCB) issued a Waste Discharge Requirements (WDR) Order. In north and central Orange County this Order has caused cities and water districts to develop better local programs to reduce sewage spills and their impacts, develop sewer system management plans, investigate and rehabilitate aging sewers, establish legal authority for new ordinances to minimize impacts from private property problems, and ensure long-range planning, staff development, and funding mechanisms. Discovery of actual system conditions is underway in many cities and agencies for guiding their long range rehabilitation plans and related financial needs. It should be noted that South Orange County sewers are in the San Diego Regional Board's jurisdiction and therefore were not affected by these more stringent standards.

Public Policy Considerations

The data provided by almost all cities and agencies responding to our survey of the wastewater collection, reclamation and treatment infrastructure in Orange County have generated several recommended Policy Options that should be considered to help overcome the challenges we face. These include:

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. Wastewater collection systems may soon be coming under new Statewide orders in early 2006 that will now apply equally to all wastewater collection systems in Orange County. This will require long-term local commitments for equipment, rehabilitation projects, and staff in south Orange County similar to what has occurred in north and central Orange County.

Public Involvement

It is strongly recommended that each individual city and agency communicate with its constituencies about the critical importance of

our wastewater infrastructure, and forge new partnerships with service groups, community committees, and business groups. Agencies should encourage service programs and fee-for-service approaches to sustain these community-desired or regulation-mandated improved levels of service. Ratepayers should request information about the condition of their local infrastructure.

Regional Cooperation

Innovative regional approaches among staff for wastewater collection and treatment systems Management, Operations and Maintenance (MOM) are recognized, especially as a result of the WDR Order in north and central Orange County. These new alliances could benefit our residents and ratepayers as financing and funding become more challenging in the future. Benefits may include improved economies of scale, sharing the most advanced technologies, and leveraging city and agency expertise to solve current and future issues.

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

To have a safe and reliable wastewater collection and treatment system that meets or exceeds all pertinent state and Federal standards, there must be sufficient and dedicated revenues that are directed toward maintaining them. Ongoing inspection and rehabilitation efforts are just beginning in many areas and must continue. It is estimated that over $ 1 billion dollars is needed over the next 10 years to fund various site specific local and regional rehabilitation projects to bring systems from current levels up to a good, but not an excellent condition. This would equate to about 28 cents per day per parcel for 10 years as a general county-wide averaged revenue need.

What You Can Do

This Guide offers continuing evidence that Orange County'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 Orange County. Here are some steps you can take to do your part in renewing Orange County's infrastructure:

1. Learn all you can about Orange County'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 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 Orange County.

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 "2005 Report on Orange County's Infrastructure", and assigned the initial grade.

The Review Councils 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 Orange County 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 results 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.

SCAG - Southern California Association of Governments
Joint Powers Authority responsible for regional planning.

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 Requirement

COMMITTEE MEMBERSHIPS

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	Name	Title/Affiliation
Co-Chair:	Yazdan Emrani, P.E.	President & CEO Advanced Infrastructure Management, Inc.
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	Sonia Nasser, PE	Manager, Engineering & PM County of Orange/RDMD Watershed and Coastal Resources
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	Claire Schlotterbeck	Executive Director, Hills for Everyone
	Tric Smith	Executive Director Irvine Ranch Land Reserve, Nature Conservancy
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	Garry Brown	Director, Orange County Coastkeeper
	Gary Johnson, P.E.	Director, Public Works, City of Anaheim
	Larry McKenney	Manager, Watershed & Coastal Resources, County of Orange/RDMD
	Herb Nakasone, P.E.	Director, Public Works County of Orange/RDMD
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	Ruth Villalobos	Chief of Planning, Army Corps of Engineers
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	Kevin Hunt	General Manager Municipal Water District of Orange County
	Ron Linsky	Executive Director, NWRI
	Bob Ohlund	President, The Keith Companies
Program Manager:	Matt Stone	Associate General Manager Municipal Water District of Orange County

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	Ray Miller	Executive Director So. Calif. Alliance of POTW's (SCAP)
	Jerry Thibeault	Executive Officer, Santa Ana RWQCB
Program Manager:	Yazdan Emrani, P.E. Management, Inc.	President & CEO Advanced Infrastructure

References

Only the main references are listed here. The detailed comprehensive references for each individual area are listed in the relevant section of the "2005 Report on Orange County's Infrastructure – Issue Briefs"

2005 Report on Orange County's Infrastructure – Issue Briefs
Civil & Environmental Engineering Affiliates,
UC Irvine October 2005

California's Infrastructure Challenge
Civil & Environmental Engineering Affiliates,
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2002 Report on Orange County's Infrastructure – Issue Briefs
Civil & Environmental Engineering Affiliates,
UC Irvine October 2002

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

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

About UC Irvine Civil and Environmental Engineering Affiliates

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 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.

The local Orange County Branch of ASCE was formed in 1952. The branch has over 1600 members, publishes a local newsletter, and meets on a monthly basis. Information on branch activities is available at: www.ascelasection.org

Promoting Countywide Economic Prosperity

The Orange County Business Council (also known as OCBC and the Business Council) is the leading business organization in Orange County, California.

OCBC is a private-sector alliance of companies and public sector partners that represents hundreds of local enterprises from small shops to giant multi-national companies.

OCBC provides the forum for businesses to join together, often in conjunction with government and educational institutions, to invest in the growth and prosperity of the fifth largest county in America.

Orange County is one of the most desirable places in the nation to live, work, raise families and enjoy an excellent quality of life. The Orange County Business Council contributes to the advancement of business so that the region's vibrant economy will continue to expand, bringing the benefits of prosperity to every corner of the county. In this regard, the Business Council has made a strong commitment to promoting investment in the county's infrastructure. These activities are centered in the organization's Infrastructure Committee and in its sponsorship of the Center for a New Orange County.

The Center for a New Orange County is a public-private partnership formed to develop constructive, collaborative actions that increase countywide prosperity and improve Orange County's quality of life. The mission of the organization is to play a key role in shaping Orange County's economic future by leading a targeted, focused countywide effort to design a collaborative, innovative, cost effective state-of-the-art infrastructure program. We are currently working with government leaders, business leaders, and the community at large to identify and test the major infrastructure issues confronting Orange County. Our work so far has provided us with a much deeper understanding of public sentiment in Orange County regarding infrastructure planning and investment.

According to polling done by the Orange County Business Council and Cal State Fullerton in 2002, 90% of Orange County residents regard infrastructure as "extremely" or "very" important. 63% of Orange County residents rate Orange County's current infrastructure as "good" or "excellent". Asked to name their top infrastructure priorities, residents rated safe water, effective sewage treatment, educational facilities, parks and recreation, and traffic and transportation as their top infrastructure priorities.