



# 2009 Report Card



## Kern County's Infrastructure A County at the Crossroads

A Citizen's Guide

# Leadership Messages on Restoring America's Infrastructure:

"We will rebuild and retrofit America to meet the demands of the Twenty-First Century. That means repairing and modernizing thousands of miles of America's roadways and providing new mass transit options for millions of Americans. If we act boldly, we will emerge stronger and more prosperous than we were before."

*Barack H. Obama*

*44th President of the United States*

*(Excerpted from ASCE's video, "2009 Report Card for America's Infrastructure")*

"Crumbling infrastructure has a direct impact on our personal and economic health, and the nation's infrastructure crisis is endangering our future prosperity. Our leaders are looking for solutions to the nation's current economic crisis. Not only could investment in these critical (infrastructure) foundations have a positive impact, but if done responsibly, it would also provide tangible benefits to the American people, such as reduced traffic congestion, improved air quality, clean and abundant water supplies and protection against natural hazards."

*Wayne Klotz, P.E., D.WRE*

*2009 National President*

*American Society of Civil Engineers*

*(January 2009 release of ASCE's 2009 Report Card for America's Infrastructure)*

"...about ASCE's efforts to inform the public of concerns regarding our infrastructure. We have been preparing report cards on the topic for several years. Unfortunately, it took the Katrina disaster and the collapse of the I-35 bridge in Minnesota to really bring this to the forefront. With few exceptions, the mainstream news has been remarkably silent on the state of the infrastructure. Over the past couple of years, our efforts to inform our elected leaders about...(the subject)...have been successful, but the economy has stifled some of the efforts for additional funding to make the necessary improvements or upgrades..."

*Don Sepulveda, P.E., F.ASCE*

*2009 President, Los Angeles Section*

*American Society of Civil Engineers*

"Unprecedented growth in the Southern San Joaquin Valley over the last decade has revealed the vulnerability of our infrastructure. Identifying specific infrastructure needs for Kern County and educating our local communities (and legislators) on these findings is vital in order to gain support and leverage funding for infrastructure improvements. Our quality of life depends on it."

*Mark Evans, P.E., M.ASCE*

*2009 President, Southern San Joaquin Branch*

*American Society of Civil Engineers*

## About the Cover:

The background photograph employed in creating this report's cover was chosen because it illustrates several significant features of the Kern County infrastructure environment. It was taken from Interstate 5 as that highway descends north from Frazier Park into the San Joaquin Valley. The resulting panoramic view provides some feeling for the county's huge size, varying topography, agrarian orientation and light population density—all factors of significance in the discussion presented in these pages. Closer study of an enlarged view of the photograph would also display a haze indicating Kern's poor air quality, emphasize the large through traffic volumes using its roadways, suggest the importance of water supply to its farming industry, and reveal examples of the oil fields that are an important feature of the state and nation's energy supply. The smaller inset photos are provided as reminders of the diverse infrastructure that must be developed, operated and maintained to assure a robust economy and good quality of life for the county's growing population.

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REGION 9, LOS ANGELES SECTION  
***Southern San Joaquin Branch***  
Founded 1971

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***Message from the Report Card Chair***

Dear Reader:

This report on the status of Kern County's public service infrastructure is a composite part of an ongoing nation-wide initiative fostered by the American Society of Civil Engineers. For considerably more than two decades, the national ASCE organization has been deeply committed to raising public awareness of the rapidly deteriorating state of all elements of this country's once-robust infrastructure. ASCE members provided important input to the National Council on Public Works for that body's 1988 report to Congress entitled *Report Card on the Nation's Public Works*, in which the emerging issues were dramatically presented in a format familiar to all elementary school students. Since 1998, ASCE has followed up on the Council's work by issuing its own report cards on a periodic basis, assessing the continuing degradation of the nation's infrastructure; the most recent version was made public in mid-2009, giving a composite GPA rating of "D" for fifteen major infrastructure categories and suggesting that a \$2.2 trillion investment over five years would be required to rectify the situation. In recent years, ASCE has been encouraging its sections and branches to develop more specific evaluations for their local membership regions, and this *2009 Report Card for Kern County's Infrastructure* is the product of that encouragement.

The Southern San Joaquin Branch of ASCE committed in late spring 2008 to the development of an infrastructure report card for Kern County, soon thereafter forming affiliations for that purpose with the Kern Branch of the American Public Works Association and the Kern Chapter of the American Council of Engineering Companies, California. Although all three organizations are relatively small in membership and resources, a committee of more than a dozen local professional engineers was successfully formed to pursue the report card assessment. The process to be followed was to be in general accord with the guidelines recommended by the national ASCE organization, but some downsizing was obviously necessary to accommodate to the committee's personnel limitations. It was determined that a total of fifteen infrastructure elements would be evaluated, a judgment that proved a bit aggressive in terms of volunteer workload; but the necessary sub-committees were formed and actively engaged in data collection by late summer (2008).

Preliminary results from Kern's infrastructure assessment were made public in October as the keynote presentation at Forum 2008, an annual event sponsored by the Kern Transportation Foundation and well-attended by regional "movers and shakers," citizen activists and the media. The overall GPA for the fifteen elements assessed was announced as "C-," an outcome that certainly attained its goal of raising public awareness. Subsequent to the Forum 2008 preview, the report card data were further analyzed and refined by the committee. They were then published in the spring of 2009 as a pocket-sized summary edition having the look and feel of a traditional school report card. The summary edition received wide distribution, particularly as a popular handout for many presentations made by report card committee representatives to civic, professional and social organizations across the county. Without exception, those presentations were met with positive encouragement and support.

This *2009 Report Card* booklet represents the final step in fulfilling the original commitment made by the Southern San Joaquin Branch of ASCE. The booklet contains, for each of the fifteen public infrastructure elements evaluated, a fairly detailed review of the factors that led to the grade assigned to that element. It is important to note that those grades were generally assigned before the impact of the American Recovery and Reinvestment Act of 2009 (ARRA, or the "Stimulus") could begin to be observed, although at least one commentator has suggested that the Stimulus infusion of federal infrastructure funding merely represents "a good start" against the ASCE estimate of \$2.2 trillion in needs.

General factors already identified in ASCE's national report card have likewise hindered implementation of needed local infrastructure improvements. Such factors include: limited governmental planning, misplaced priorities, lack of consistent funding, and stringent environmental regulations. The grades given in this report particularly reflect the lagging condition of most of our transportation systems and of our water supply sources—especially water flowing through the Sacramento Delta to Kern County.

As was true of the pocket-sized summary, copies of this *2009 Report Card* booklet will be provided to Kern County's leaders, including state and federal legislators, local government officials, and interested citizens, to support ASCE's continued thrust for public awareness at all levels of the critical state of public infrastructure across the U.S. This country is currently confronted with numerous economic, political and social problems, but in the opinion of many professional engineers, none is more important than maintaining the infrastructure systems that are the foundation of its economy and its quality of life.

The essential next step for concerned citizens and governmental officials to take in addressing the issues highlighted in this report is to proactively confront the hard decisions required to restore our deteriorated infrastructure systems. Continuing the popular political strategy of "kicking the can down the road" can no longer be tolerated. Future generations will be extensively affected by the choices we have before us, and it is past time for those choices to be made in consideration of the general good, rather than in response to any self-serving pressures from special interest groups.

Publication of this report booklet has taken considerably longer than originally estimated, but the fact that it has been achieved at all is a testimonial to the dedication and perseverance of the committee representing the Southern San Joaquin Branch and its affiliates in attempting the project. It has been a monumental task for the small team involved, and as chair of this important effort, I am honored to express my deepest appreciation to all its members. They have devoted many hours of their personal time to provide a very important service to the citizens of Kern County. Additional appreciation is also due to the many public officials who unreservedly cooperated with the committee during the extensive data collection process.

Sincerely,

Anthony N. Lusich, P.E.  
Chair, Infrastructure Report Card Committee

## INTRODUCTION

### Our Region's Public Service Infrastructure— An Asset Essential to Our Economy and Quality of Life

#### What is Infrastructure, and Why is it so Important?

Prior to the recent onset of recessionary times, Kern ranked well up among California's fastest-growing and most prosperous counties. While the county has been heavily impacted by the recession, it also has a tradition of economic and social resilience and may be expected to regain its developmental momentum over time. One of the key determinants in the speed and dimensions of that recovery will be the availability of a fully supportive public service infrastructure. In engineering terminology, "public service infrastructure" refers to a broad range of physical resources, including: airport, roadway, bridge, transit, railway, waterway and other transportation facilities; energy generation and distribution networks; water supply and waste water disposal systems; dams, levees and other flood control provisions; solid waste disposal installations; schools; parks and recreational facilities; and installations required for air quality control. In sum, these resources provide an essential foundation undergirding all modern societies, and it is generally understood that no developed country can afford to lose sight of their critical importance to the maintenance of its economic well-being and quality of life. Such concerns are obviously as important at the local and state government levels as they are at the national, and Kern County is no exception to that rule.

It is also important to understand that public service infrastructure may include elements that are not necessarily publicly owned. Examples of the latter include most railway facilities and many electrical energy generation and distribution systems. These important resources are often held in private ownership but make fundamental contributions in advancing the general public good. Throughout this report, references to "infrastructure" or "public infrastructure" should be understood to subsume the possibility that some portion of the facilities under discussion might not be the immediate property of a governmental entity, but instead are providing basic services through an appropriate structured relationship.

In the late Nineteenth Century and for much of the Twentieth, the United States was a world leader in infrastructure development. This country made an enormous investment in public works over that period, and the investment resulted in a productive economy of epic proportions. However, the national political agenda seemed to change considerably as the Twentieth Century wound down and the Twenty-First began, and among the victims of that change was the country's public infrastructure. One statistical comparison tells the story in brief: in the 1950s, the Eisenhower administration's budget contained 11.5% for infrastructure; by the time of the G.W. Bush administration, that provision had shrunk over the years to 2.5%. The same phenomenon has occurred in California, where—according to the California Infrastructure Coalition—public works expenditures shrank from almost 20% of statewide spending in the 1960s to about 3% in 2005 despite enormous growth.

To achieve other political goals without identifying new revenue sources to fund them, legislators at all levels have apparently chosen to "rob Peter to pay Paul" by significantly reducing financial support for the infrastructure so essential to a healthy and competitive economy. The results of this injudicious choice have become more than obvious across this country: highways are congested; schools are dilapidated and overcrowded; water management and flood control facilities are increasingly inadequate and near failure condition; landfills are approaching or past rated capacity; and parks and recreational spaces either cannot accommodate user demands or are being shut down due to inadequate support. For several decades individuals and professional groups representing the planning and design disciplines, with the American Society of Civil Engineers a strong voice among them, have attempted to gain the attention of governmental decision-makers to the critical

nature of such concerns. Unfortunately, these efforts have largely been ignored or downplayed until the recent past, when major failures—involving bridges, levees, water supply systems, municipal sewers, transit safety equipment, energy supply systems and numerous other infrastructure elements—have begun to occur on an all-too-frequent basis across the nation and have become a media focus.

## **What is the Status of Kern County's Infrastructure?**

As this report indicates, Kern County has not escaped the effects of governmental inattention to infrastructure investment; and California's ongoing economic crisis has only exacerbated that situation. This report summarizes the results for an assessment of fifteen local public infrastructure elements by volunteer professional engineer members of ASCE's Southern San Joaquin Branch. That assessment rated a few elements as being in sound condition, solid waste disposal facilities, energy production and distribution systems, and airports ranking highest. However, the majority of the elements assessed were seen as needing significant attention at an early date—and some were disturbingly inadequate.

A few noteworthy examples of Kern's infrastructure inadequacies deserve particular mention. Although a recent one-time infusion of major federal funding has been provided for specific highway improvements in the metropolitan Bakersfield area, many roadways in Kern County are in near failure mode, while both state and local governments have very large backlogs of unfunded maintenance and improvement projects. Isabella Dam, the primary flood control resource protecting metropolitan Bakersfield and a large flood plain around the city, is now under U.S. Corps of Engineers scrutiny due to seismic concerns and related issues. Kern County's air quality is rated among the worst in the United States, with considerable pessimism existing that sufficient improvements can be made in time to meet stringent new California emissions standards. Despite growing federal pressures for improvements in the quality of K-12 education, many school districts across the county are holding classes in aged and inadequate classrooms, having no means available to initiate necessary repair and replacement programs. And, Kern's water supply is in large part dependent upon very undependable sources in Northern California.

While Kern is home to eleven incorporated communities, except for Bakersfield and the more than 330,000 residents within its city limits, all of those communities are relatively small. Like Bakersfield, they struggle with proportionate funding limitations on their infrastructure and other public resources. In that regard, one reoccurring theme in this report relates to the difficulties that several marked physical and demographic characteristics of Kern County create for those who are responsible for developing and managing its public infrastructure. Among them are the county's huge size (nearly 8,200 square miles, the third largest in the state) and light population density, its complex topography, a recognized tendency to extensive urban sprawl in its few population centers, the extreme commitment of its citizens to the automobile as the preferred transportation mode, and last—but far from least—its positioning as a primary crossroads hub for rail and highway traffic passing through Central California.

The county has experienced a few recent successes in infrastructure improvement, but unfortunately they have not been a part of any focused or comprehensive regional program. Several of Kern's numerous school districts have been successful in obtaining voter approval of bonds to support new or improved facilities; but these have been isolated instances, and other districts have held elections in which similar bonding proposals have failed. Significant federal funding has been provided in the last few years to construct a handsome new terminal at Bakersfield's Meadows Field airport and to develop major highways to serve that same community; however, these were also one-of-a-kind occurrences resulting from the intervention of a local congressman. On the other side of the ledger, two important ballot measures to add a half cent to the local sales tax and thus make Kern a "self-help" county in terms of transportation funding have both been defeated in recent years, albeit by narrow margins.

This report on Kern County's public infrastructure contains an implicit call to action. The county's existing infrastructure has

received an overall grade of C- from many of the same engineering professionals who are dedicated to its development and operation. That assessment has been provided with some reluctance, but also with a commitment to honesty and reality. Further, the report indicates that there is currently no clear path at any governmental level—local, state or national—to the full resolution of the issues that have been defined. It must be accepted that few persons residing outside of Kern County would have the same motivation to address those issues as local citizens. Also, unless change occurs, it seems clear that infrastructure across the county will continue to deteriorate and adversely impact upon Kern's economy and quality of life.

### What Needs to be Done, and Who Needs to do it?

Since this report highlights an urgent need for change, the average resident of Kern County is likely to have a number of related questions. Who should have the greatest immediate interest in effecting the change? Who is responsible for taking action? What is the role of the individual taxpayer?

At least part of the answer to such questions is voiced in ASCE's unchanging challenge to the American public in pursuing its report card program, a challenge that was well stated in presenting its *2001 National Report Card*:

"The nation's critically important foundation for economic prosperity received a cumulative grade of D+. Shortfalls in federal and state funding and changing population patterns have placed a tremendous burden on our aging water and wastewater systems, airports, bridges and highway facilities. In life, you get what you pay for, and America has not been paying for its infrastructure for decades."

The overall grade for our country's infrastructure awarded by ASCE in releasing its *2009 National Report Card* was D. Sadly, the grade has now dropped even lower than that awarded in 2001, and the estimated national five-year investment required to restore our infrastructure's serviceability has risen from \$1.3 to \$2.2 trillion.


Obviously, Kern County's infrastructure concerns simply represent a microcosmic view of much larger problems confronting the entire nation, problems now carrying an enormous price tag for their resolution. However, the clear answer to the question of who is responsible for the actions necessary to achieve that resolution is simple, whether we like it or not: the individual American citizen. The central character in the long-running comic strip *Pogo* (1948-1975) offered a most memorable quote on Earth Day 1971: "We have met the enemy, and he is us." While bureaucrats, politicians and other persons seen as leaders of public opinion are the favorite targets, many Americans tend to blame almost anyone else in the country other than themselves for our decayed infrastructure. However, in this great U.S. democracy, the individual voter ultimately has the deciding voice in selecting leaders, in setting governmental agendas, and in approving bond issues and other related referendums.

For several decades, majority votes at all levels of government in this country have supported political directions that have ignored essential infrastructure maintenance and improvements in favor of less substantial but more immediately appealing—and often self-serving—options for public investment. Frequently, resulting regulations have become impediments to infrastructure improvements as well as to commerce essential in generating public funds for those improvements. Now such long-deferred bills have come due and must be paid if our democracy is to maintain its economic and social momentum. The citizens of Kern County will need to accept their local share of that burden. This report may provide a call to action and indicate the needs that must be addressed, but community members united for productive change represent the only true source of the political will and energy required to correct the situation and build for our future.



## Grading Kern County's Infrastructure

Using general procedures first employed by ASCE at the national level, the Southern San Joaquin Branch's Infrastructure Report Card Committee (IRCC) assigned letter grades to fifteen categories of Kern County's public service infrastructure. A composite grade was also assigned to the six categories of transportation infrastructure assessed individually, and a final, over-arching single grade for Kern's entire public service infrastructure was determined. The basic Report Card itself appears in the figure shown below. A summary for each of the fifteen individual categories is also presented in this section of the report, and a much more detailed discussion of each category is then provided in ensuing sections.

 <b>2009</b> <b>Report Card</b> for Kern County's <b>Infrastructure</b>	
Atmospheric Quality	D
Energy	B
Solid Waste	A
Waste Water	B-
Domestic Water	B-
Northern Calif. Delta	D
Schools	B-
Parks	C-
Transportation	D+
Airports	B
Roads	D
Highways	D
Transit	C-
Bridges	C+
Rail	C+
Flood Control	D+
<b>Kern County's Infrastructure</b>	<b>C-</b>

D

### **Atmospheric Quality**

Kern County's air quality is rated highly unhealthy due to several recognized pollutants, especially NOx. Mobile sources now emit about 480 tons per day (TPD) of NOx. Major reductions are necessary to meet mandatory standards: e.g., a reduction of about 290 TPD is required for PM2.5 attainment (deadline 2019). Kern's transportation subventions will not be immediately affected unless new projects further degrade air quality. Further, implementation of the California Global Warming Solutions Act of 2006 (AB 32) includes such stringent requirements as: a reduction of greenhouse gas (GHG) emissions throughout California to 1990 levels by 2020 (approximately 8% below 2005 conditions); and a further reduction to 20% below 1990 levels by 2050 (approximately 34% below 2005 conditions).

B

### **Energy**

Kern County produces significant amounts of California's energy, including: oil (77%), refined fuel (5%), natural gas (65%), electricity (9%) and wind (about 4% of nation's entire source output, and 28% of California's). The county is very well positioned to help provide for future renewable energy (wind and solar) needs. Significant projects are in various stages of planning and development, and major regional electrical transmission lines are currently being upgraded for near-term demand and future capacity. California electric corporations are mandated to achieve a 20% procurement from eligible renewable energy resources by 2010; such procurement is currently about 13%, with the percentage actually decreasing since 2003. Whether or not contracted developments will mitigate the procurement requirement is uncertain.

A

### **Solid Waste**

Kern County's lead agency for compliance with California's Integrated Waste Management Board (IWMB) requirements is its Waste Management Department, which plans, constructs and operates nearly 30 permitted disposal facilities of cutting-edge quality, supplemented by an award-winning City of Bakersfield green waste facility. City and county staffing seems superior, reflected both in excellent report records from reviewing agencies and in comprehensive written plans for service growth and development. Capital funding for program sustainability is available from fee-based enterprise accounts. Overall, Kern's solid waste management resources seem extremely well positioned to respond to the IWMB's stated goal of "Zero Waste."

B-

### **Waste Water**

The twelve major Kern County cities reviewed have plants that generally perform well, with a total rated treatment capacity of 97 million gallons per day (gpd). They serve about 80% of county residents, handling some 59 million gpd of existing wastewater flow. However, the majority of the plants are "organically overloaded," receiving waste of higher strength than assumed in their design. New groundwater limits on nitrogen content being implemented by the Regional Water Quality Control Board may require Kern's municipalities to convert to nitrification and denitrification treatment processes. While the City of Bakersfield is planning to meet such requirements through plant expansion, not all local communities have been able to address them. Although collection systems were not included in this review, newly-adopted state-wide sewer discharge standards are also requiring many municipalities to assess deficiencies in those systems relative to impending compliance deadlines.

B-

### **Domestic Water**

The domestic water supply infrastructure for most Kern County residents is average to good. However, systems located outside urban Bakersfield typically have one or more issues or problems: reliance predominantly or completely on ground water, with limited current capacity, falling water tables, no expansion capability, and water quality concerns; and funding sufficient only for current operations, with no allowance for adequate maintenance, repair or replacement. Urban Bakersfield systems have multiple water sources and groundwater banking programs, and are generally better financed. The Bakersfield metropolitan area has also recently expanded or constructed surface water treatment plants that deliver high quality water. One significant issue that does impact urban Bakersfield is the reliability of water supplies from the State Water Project.

D

### **Northern California Delta**

About two-thirds of California residents and much of the state's agricultural industry rely on water pumped from the Sacramento-San Joaquin River Delta. In an "average" year, Kern County receives more than 20% of its water from that source. In 2006, a State of Emergency was declared over the deterioration of the Delta's levee systems, but only immediately necessary repairs and some future planning have been carried out, even though a 75% probability exists over the next 30 years for a magnitude 6.5 earthquake affecting the Delta. A long-discussed peripheral canal project to channel water to Southern California around the Delta still has not been implemented. This 2009 Kern County infrastructure Report Card concurs with the grade awarded by the Sacramento Section of ASCE in 2006 after an in-depth review of the Delta's condition.

B-

### **Schools**

Some 272 schools are extant in 8,000-square-mile Kern County, the largest percentage in the Greater Bakersfield area. Many, while safe and well maintained, are more than 25 years old and need upgrades and renovation to facilitate student learning. Including space to house the 14,000 additional students forecast in the next five years, it is estimated that \$250 million in state and local funds will be needed annually over that period for school facility construction and renovation. Surveys indicate that more than 60% of Kern's districts may ask voters for increased capital funding, but substantial State support will also be required. However, that support, both for capital construction and for deferred maintenance, is often inadequate and inconsistent.

C-

### **Parks**

Most existing park facilities in Kern County are in good or better condition, but many do not meet the minimum standards for park and recreation facilities established by the National Recreation and Park Association. Further, some park and recreation infrastructure does require urgent repair and updating (e.g., irrigation systems that are 30 to 40 years old and inadequate play fields and playground equipment). Current deficiencies in funding for routine maintenance and upkeep of existing facilities and for meeting projected new service demands are also a serious concern. Existing facilities are clearly inadequate to respond to the county's future population growth forecasts.

B

### **Airports**

The county's regional airport system includes 7 airports operated by the Kern County Department of Airports, 4 municipally owned airports, 3 airport districts, 2 privately owned public-use airports, and 2 military facilities. The 14 public airports were evaluated for this Report Card, and the existing infrastructure and facilities were found in good condition. Adequate access and overall capacity are being maintained. Operations are within accepted safety standards, as well as in compliance with other regulatory criteria specific to security, airspace controls, noise levels, and community compatibility issues. Annual funding currently is available for maintenance, repair, and capacity enhancements, but due to prevailing economic conditions, concern does exist with regard to future maintenance funding levels.

D

### **Roads**

There are over 3,300 miles of roads in Kern County's jurisdiction, and an estimated \$200 million maintenance and improvement deficit exists—for several years, the Kern County Roads Department received no funding for maintenance. The City of Bakersfield contains some 1,100 miles of streets, and its estimated maintenance and improvement deficit is estimated at \$100 million. The total deficit for the 10 other incorporated communities in Kern County is estimated to be approximately \$130 million. In 2007, congestion is believed to have cost citizens 3.3 million hours and \$73 million in Bakersfield alone. Street and road maintenance requirements throughout Kern County are clearly substantially underfunded.

D

### **Highways**

Kern County shares in Southern California's general need for highway and freeway improvements to address a plethora of pressing issues, including: poor interconnectivity, traffic congestion, rail crossing delays, maintenance deferrals, inadequate capacity, rising fuel costs, and health and safety concerns. While the county was fortunate to receive \$630 million in one-time earmarked federal funds in 2005, its income from local impact fees and various state and federal sources is generally insufficient to meet identified needs. The backlog of unfunded critical projects totals some \$1.5 billion in metropolitan Bakersfield and about \$500 million for the remainder of Kern County. This funding problem is exacerbated by the fact that Kern is not a self-help county (no local sales tax), and is thus neither eligible nor favored for some state funding sources.

C-

### **Transit**

The size and geography of Kern County and its tendency to urban sprawl in more heavily-populated areas have been counter-productive to the development of effective transit services. However, two relatively large transit systems are extant in the county: Golden Empire Transit, serving metropolitan Bakersfield, and Kern Regional Transit, operated by the County of Kern as an outreach to rural areas. GET operates about 80 busses traveling nearly 4 million miles per year, and KRT has some 60 vehicles that record about 2 million miles annually. Each of the systems is heavily committed to clean-burning CNG. While ridership and related fare income have recently increased as a reflection of the U.S. economy, in neither case has that income reached as much as 25% of the operating budget. A few very limited localized transit services also operate in some smaller Kern County communities, but there is little overall cross-county continuity.



A large, bold, black 'C+' symbol is centered within a light gray square box.

### **Bridges**

The U.S. Department of Transportation's National Bridge Inventory database indicates that, on average, the 610 state highway and local government bridges in Kern County are in better condition than is evidenced by either the California or the national averages. Nevertheless, almost 20% of Kern's bridges are distressed by federal inspection standards. As is true of all elements of the roadway network within the county, the funding projected from all available sources, federal, state and local, is insufficient to mount an effective bridge maintenance and rehabilitation program.

A large, bold, black 'C+' symbol is centered within a light gray square box.

### **Rail**

Although Kern County is situated as a major commercial crossroads for California, its Amtrak passenger and BNSF long-haul "heavy" freight rail services along the San Joaquin Corridor share heavily-congested single-line track with frequent at-grade crossings. Use of the Tehachapi Pass between Bakersfield and Mojave is limited to freight loadings and is shared by BNSF and UPRR; Amtrak buses move passengers between Bakersfield and Southern California. While numerous plans do exist for Corridor improvements to expedite traffic and meet impending health and safety requirements, funding availability for such projects seems indefinite. When implemented, high-speed rail will resolve many passenger movement problems—but not for more than a decade.

A large, bold, black 'D+' symbol is centered within a light gray square box.

### **Flood Control**

Flood control concerns in Kern County primarily focus on the protection of Bakersfield and its surrounding region from Kern River overflows. Prior to the 1953 completion of Lake Isabella Dam on the upper reaches of that river, the city experienced major flooding in 1867, 1893 and most recently, in 1950, just as the county's population began a significant increase. The dam is owned and operated by the U.S. Army Corps of Engineers and now supports not only flood control but also recreational, agricultural and hydroelectric uses. Due to cost considerations, only a few other much smaller flood control facilities have been constructed since Isabella's completion. The dam (and the related levee system through Bakersfield) is now under scrutiny due to seismic concerns and the increased awareness of vulnerabilities attributed to earthen dams and levees. Kern County has no consistent program dedicated to flood hazard reduction.

## ATMOSPHERIC QUALITY [D]

### Infrastructure Issues in Kern County Related to Atmospheric Quality

#### Editorial Note

Early in 2009, the Southern San Joaquin Branch of ASCE issued the results of its infrastructure assessment for Kern County as a pocket-sized summary edition having the look and feel of a traditional school report card, and this section of the report was entitled “Air Quality.” However, in the brief intervening time period between the publication of that summary and this detailed report document, the extremely rapid emergence of so-called greenhouse gas (GHG) emissions as a recognized threat to the global environment has led to an extension of the section’s content to incorporate some pertinent GHG considerations. Accordingly, the section title has been modified to reflect that change, but after due deliberation, the section grade remains unchanged.

#### Atmospheric Quality and the Public Infrastructure

A vast complex of public agencies, laws, regulations, standards and plans relating to air quality has developed nationwide in the recent past. These elements act variously at national, state, regional and local levels, and are clearly growing in quantity and complexity in governmental attempts at controlling current and future mobile, stationary and area-wide pollution sources. Even more recently, concerns of international scope about the atmospheric impacts of GHG emissions have surfaced, and regulatory responses are beginning to appear across the nation and around the world. While such issues have historically not been a direct civil engineering design concern, they are now rapidly moving to the forefront as constraints on project planning, environmental studies and approval processes. Unfortunately, Kern County’s weather patterns, its geography and its crossroads positioning in the state have combined to create regional air quality rated among the worst in the nation. These circumstances are exacerbated by the fact that the principal industries extant in the county include energy production, agriculture and mining, all of which incorporate elements having the potential for serious atmospheric degradation.

The ramifications of the county’s crossroads location are discussed in several other sections of this report (e.g., Roads, Highways, Rail, etc.), and they are highly significant for a lightly-populated governmental sub-division of such huge size. Since large volumes of passenger vehicles and long-haul heavy trucks pass through Kern County on Interstate 5 and State Routes 99, 58 and 46, mobile source emissions due to intra-county commuting and other local traffic actually constitute only a small fraction of the total as compared to highly metropolitan areas such as the Los Angeles complex. This pattern of heavy road and highway use by external emitters obviously contributes much to the Kern County emissions inventory, while the effectiveness of local transportation-related efforts at mitigation is correspondingly limited. The situation is similar for rail transportation: large quantities of freight are transported through Kern County from the ports of Long Beach, Los Angeles, Oakland and Stockton to destinations in the central and eastern portions of the United States. Rail emissions per mile are less than those for heavy trucks, but they are still appreciable.

Air quality constraints in Kern County and elsewhere often focus on efforts to reduce mobile source emissions by lowering individual vehicle miles traveled and/or exhaust efficiency, particularly during concentrated urban commuting times. In consequence, planning for multi-use and infill projects now commonly includes a public transportation element, and bicycle lanes are typically included in street planning and design. Carpooling, bicycle use and walking are encouraged for commuting and for shoppers, where possible. A wide variety of related emission reduction strategies have surfaced across the county: transit vehicles are converted to use compressed natural gas as a fuel; unsurfaced roads are watered during operation periods or paved to reduce soil disturbance and dust generation; some development projects mitigate emissions by replacing agricultural diesel and gasoline water well pumps with less polluting motors; and consideration has been given to the inclusion of electric automobiles in packaging residential home sales.

Because energy production is a primary industry in Kern County (see Energy section of this report), both newly designed and currently existing production facilities in Kern County are being modified to meet air emissions requirements and to serve as air quality offset mitigation resources for other new projects. These include improvements such as gas fired co-generation facilities, petroleum refineries and oil and natural gas exploration, extraction, transportation, and storage facilities. Existing

standards for public utilities. These standards are intended to encourage energy sources that do not generate GHG emissions during operations.

Agricultural operations also constitute a major sector of Kern County's economy. Air quality impacts from those operations are chiefly due to significant contributions in the air-borne fine particulate matter category, with other emissions amounting to only relatively minor fractions of the total. Major sources include tilling, harvesting, animal husbandry, food processing and agricultural burning.

Kern County provides a base for several other important industries identified as significant stationary emission sources, particularly those associated with mining and mineral production. A key example is the manufacture of portland cement. This essential construction material is produced in quantity in the county, which has major deposits of the requisite minerals. Local cement producers have been confronted with the need to implement extensive and expensive facilities retrofit programs to comply with particulate standards.

### **Regulation of Air Pollutants**

Air pollutants are generally identified as those substances that can affect human health. Criteria pollutants are air pollutants for which acceptable levels of exposure can be determined and for which an ambient air quality standard has been set and are regulated. These regulated pollutants are ozone, carbon monoxide, nitrogen dioxide, sulfur dioxide, and PM10 and PM2.5. The latter designations refer to particle pollutants, including dust, ash, soot, lint, smoke, pollen, spores, algal cells and other air-suspended materials; PM10 particles are those with nominal diameters of 10 microns or less, and PM2.5 is a similar measure for finer suspended particles.

"Non-attainment" is a designation for any area that does not meet (or that contributes to ambient air quality in a nearby area that does not meet) the national primary or secondary ambient air quality standard for the pollutant. The San Joaquin Valley portion of Kern County is considered by the U.S. Environmental Protection Agency (EPA) to be a non-attainment area for ozone and particulate matter. The primary air pollutants contributing to that non-attainment status are various oxides of nitrogen, generally known as NOx.

Currently, total mobile source emissions within the local area are about 480 tons per day (TPD). Heavy-duty trucks contribute about 210 TPD, and passenger vehicles are responsible for some 110 TPD. Agricultural operations add perhaps 25 percent to the PM2.5 total. Kern County is mandated by the EPA to achieve a reduction from about 580 TPD (unregulated projection) to about 290 TPD for PM2.5 attainment in 2019. Similarly, the required reduction for ozone attainment in 2014 is 160 TPD.

The national Clean Air Act is intended to ensure that federal funding and approval are only given to highway and transit projects that conform to the air quality goals established by a state air quality implementation plan (SIP). Conformity, in regard to the purpose of a SIP, indicates that transportation activities will not cause new air quality violations, worsen existing violations, or delay timely attainment of the national ambient air quality standards. It is possible that relative levels of NOx emissions from mobile sources may be used by California in the future as a determinant for allocating state funding for new transportation construction projects. At present Kern's transportation plan does conform to the air quality goals, and transportation funding will not be taken away—as long as new projects do not further degrade local air quality.

The status of GHG as regulated air pollutants is not fully determined at this time. These are gases within the atmosphere that absorb and emit radiation within the thermal infrared range. They are considered to be the fundamental cause of the greenhouse effect influencing the Earth's temperature, and scientifically, they include water vapor, carbon dioxide, methane, nitrous oxide, and ozone. The EPA does not consider GHGs to be regulated as yet, but California moved ahead with such regulation by the 2006 enactment of AB 32. Bureaucratically, EPA's future GHG regulations are likely to cover the six substances named in the so-called "Kyoto Protocol" implemented in 2005: carbon dioxide, methane, nitrous oxide, and three groups of fluorinated gases (sulfur hexafluoride, HFCs and PFCs).

For both Kern County and California, NOx emissions are dominated by heavy-duty trucks. The predominant California CO<sub>2</sub> emission category is cars, light trucks and motorcycles. For major categories other than heavy-duty trucks, the percentages for CO<sub>2</sub> emissions exceed those for NOx emissions. While imported electrical generation is included in the California GHG emission category, Kern County makes little or no contribution to that category. Table 1 provides a summary of estimates for

emissions of NOx and CO<sub>2</sub> in 2006.

**Table 1**  
**Summary of 2006 Emissions in Kern County and California by Source**

Emission Category	Kern NOx	California NOx	California CO <sub>2</sub> <sup>1</sup>
Cars, Light Trucks and Motorcycles	4.6%	12.8%	30.8%
In-State Electrical Generation	2.0%	0.8%	12.8%
Imported Electrical Generation	0.0%	0.0%	11.7%
Petroleum Refining	0.8%	0.9%	8.9%
Heavy-Duty Trucks <sup>2</sup>	63.7%	50.8%	8.6%
Manufacturing	2.0%	2.6%	4.4%
Oil and Gas Extraction	4.5%	0.6%	4.2%
Other <sup>3</sup>	22.4%	31.5%	18.5%
<b>Notes:</b> 1. CO <sub>2</sub> does not include Sinks & Sequestrations 2. For NOx emissions “heavy-duty trucks” includes medium and heavy-duty gas and diesel trucks 3. “Other” includes agricultural activities, combined heat and power generation, pipelines, mining, other petroleum industrial, other industrial, aviation, rail, water-borne craft, other transportation, and geothermal; each of these sources had less than 2% of total emissions			

Recent laws enacted in California having important implications for air quality management in Kern County, and the San Joaquin Valley in general, include:

#### **California Global Warming Solutions Act of 2006: AB 32**

The California Global Warming Solutions Act of 2006, AB 32, requires a reduction of GHG emissions throughout California to 1990 levels by 2020 (approximately 8% below 2005 conditions). The target reduction by 2010 is to 2000 levels (approximately 3% below 2005 conditions). A further reduction to 20% below 1990 levels is required by 2050 (approximately 34% below 2005 conditions). In contrast, the population increase and the growth in vehicle miles traveled in Kern County by 2020 are projected to be about 31% and about 38%, respectively. There is still some active controversy statewide regarding the link between climate change and GHG emissions, and even more heated controversy continues over the possible economic impacts of implementation of stringent greenhouse gas-related regulations. California’s contribution to GHG emissions is about 1% of the worldwide emissions.

#### **Transportation Planning: SB 375**

This 2008 legislation requires metropolitan planning organizations to include sustainable communities strategies in their regional transportation plans for the purpose of reducing greenhouse gas emissions. It further attempts to align planning for transportation and housing and to create incentives for implementation of the various strategies involved. In part, it provides a means for achieving AB 32 goals. A key basic focus is to limit urban sprawl by land development projects and encourage “smart growth,” so that GHG reductions are achieved by cutting down on the need for commuter travel. Commuter travel is measured as vehicle miles traveled (VMT). It is too soon to determine the actual effectiveness of SB 375 in changing California processes for regional transportation planning and development. Initial measures will be developed as voluntary guidelines.

#### **Conclusions**

NOx emissions attainment is needed in the San Joaquin valley portion of Kern County to conform to ozone and particulate matter goals. Conformity to ongoing laws and regulations appears to have the potential to complicate and delay land development, transportation, petroleum-related and various other projects. The consequences of non-attainment may include reduced funding for transportation projects or the elimination of some existing or proposed improvements. However,



the economic impacts of such consequences could be offset by additional business activity related to the installation, operation and maintenance of renewable energy facilities and the effectiveness of energy conservation efforts.

### **Selected Information Sources**

1. Kern Council of Governments and Kern Transportation Foundation, *Roads to Ruin*, January 2002.
2. Kern Council of Governments, *Final Air Quality Conformity Analysis for the 2007 Federal Transportation Improvement Program, Amendment #3 and the 2007 Regional Transportation Plan (RTP)*, adopted May 17, 2007.
3. California Air Resources Board, Emissions Inventory website, <http://www.arb.ca.gov/ei/ei.htm>.
4. California Air Resources Board Greenhouse Gas Emissions Inventory and Mandatory Reporting website, <http://www.arb.ca.gov/cc/ccei.htm>.
5. US Environmental Protection Agency website, <http://www.epa.gov/>.

## **ENERGY [B]**

### **Energy Infrastructure in Kern County**

Kern County's economy was primarily agriculturally based prior to the 1899 discovery of petroleum in the Kern River field. Within four years, the Kern River field was producing seven out of every ten barrels of oil in the state, and California was the top oil-producing state in the country. Now, more than one hundred years later, Kern County's energy industry has greatly diversified and evolved into a major source of economic strength. That industry currently employs more than 10,000 people and ranks first in its proportion as a contributor to the local economy. Oil production alone amounts to about one-third of Kern County's property tax base.

However, oil production is no longer Kern County's sole contribution to California's energy pool. The county's geographic location in the state and its topography and climate have served it well in recent years in supporting its entry into other energy-related technologies. The county has become a state leader in the production of electricity from a variety of locally abundant resources, ranging from natural gas-fired power plants and cogeneration facilities to wind, solar, hydroelectric, and biomass installations. As a result, Kern County is now a net electricity exporter.

Current and impending air quality and greenhouse gas (GHG) emission issues facing California are expected to significantly affect the energy industry in Kern County. These environmental issues, as well as the legislative actions highlighting and influencing them (e.g., AB 32 and SB 375), are discussed in some detail in the Atmospheric Quality section of this report. The full long-term impact on energy producers is not yet clear, but fundamental statewide changes in the industry are anticipated.

### **Oil and Gas Operations**

Kern County plays an important role in meeting the nation's oil and natural gas needs. About 2,400 wells were drilled in Kern County in the year 2000, more than in any other county in the nation. The deepest producing well ever drilled in California was sunk in Elk Hills to a depth of 14,570 feet in 2005.

### **Petroleum**

Kern County produces about 77% of California's crude oil. This represents approximately 10% of the nation's total oil production, and is enough to fuel about 5½ million automobiles. Of California's approximately 43,000 producing oil wells, 86% are in Kern County. The state's five largest producing oil fields are in the county, including three of the six largest oil fields in the United States. If Kern County were a state, it would rank fourth in the U.S. in oil production.

Kern County production is enhanced by means of secondary recovery using advanced steam and other thermal methods. The county's producers have long been worldwide leaders in the development of such technology.

Refinery operations in Kern County provide some 5% of California's capacity, producing refined products including gasoline,

diesel fuel, propane, motor oil, asphalt and ammonia.

#### Natural Gas

Kern County provides some 65% of the natural gas produced in California, with Elk Hills being the largest gas-producing field in the state. Of California's more than 1,200 producing gas wells, 12% are in Kern County.

#### Electrical Energy Generation

Kern County has an electrical power generating capacity of about 5,800 megawatts, enough to provide energy to about 3 million households. The excess electricity produced is directed to other areas. The following table illustrates Kern County's electrical generation capacity and usage.

**Table 2**  
**Kern County Electrical Generation and Usage Characteristics**

Type of Generation	Capacity		Usage	
	Kern (MW)	Kern (% of California)	Kern (Million kwh)	Kern (% of California)
Natural Gas	4,784	12%		
Wind	730	27%		
Coal	130	32%		
Hydroelectric	117	1%		
Biofuels	50	5%		
Geothermal, Nuclear, Oil and Solar	0	0%		
<b>Total</b>	<b>5,811</b>	<b>9%</b>	<b>16,294</b>	<b>6%</b>

A significant number of additional electrical power generation projects are in prospect across Kern County, including many involving wind, solar and other non-polluting technologies. For example, the United States Department of Energy has announced that a proposed local hydrogen fuel project including CO<sub>2</sub> sequestration will receive a \$300,000,000 grant.

Several evolving forms of electrical power generation have an important presence in Kern County:

#### Cogeneration

Kern County's state leadership in the production of electricity comes primarily from natural gas fired power plants and cogeneration facilities. Most of the power plants now use new, more efficient, two-stage equipment that recycles what were once exhaust gases from the primary turbine to a second, lower grade, turbine power production system. Natural gas inherently produces less air pollution than most other combustible fuels.

High efficiency cogeneration facilities play a vital role in Kern County's oil producing operations. These facilities produce two sources of energy, steam and electricity. The steam is injected into the oil reservoir and allows the heavy oil to flow and be produced efficiently, economically and with reduced air emissions. Through the cogeneration process, some 1,700 megawatts of electricity are generated at the same time.

#### Biomass

Biomass processes use agricultural waste and other waste wood materials as fuel for electricity generation. This results in significantly less particulate air pollution than field burning. An existing biomass facility has been in operation in Delano for several years. Conversion of traditional fuel power generation facilities to biomass fuel sources is in progress at other sites in

Kern County.

### Wind and Solar

Currently a small, but increasingly important, segment of today's energy supply, wind and solar sources do not create pollution and are sustainable. California electric corporations are mandated to achieve a 20% procurement from eligible renewable energy resources by 2010; such procurement is currently about 13%, with the percentage actually decreasing since 2003. However, major efforts are going forward statewide to reverse that trend. Both state and federal tax breaks are available to qualified residential solar and commercial wind turbine projects.

Wind turbines introduced 26 years ago in the Tehachapi area were some of the first to be installed in the United States. Eastern Kern County has significant wind energy production operations in the Tehachapi Wind Resources Area, representing about 28% of the California's capacity. At present, the growing Kern County wind energy industry provides approximately 1% of the state's overall electricity needs.

The potential for solar electrical generation is significant as there are more than 300 days of sunlight in Kern County each year. Because of this nearly year-round exposure, homeowners, businesses and municipalities are highly motivated to install these types of systems to supplement electrical needs.

### Public Utilities

The service provided by Kern County utilities to residential, commercial and industrial consumers is, in general, very good. The rates charged are set by the California Public Utilities Commission (CPUC) and are paid by the local consumers of the energy. Rates are designed to pay all expenses including improvements and upgrades. However, as mentioned previously, a concern exists that commercial electrical power suppliers may not be able to comply with state-mandated requirements for the use of renewable energy sources.

Some elements of the state's power transmission grid are currently seen as marginal. In response, major electrical transmission line projects are being designed and have been submitted to the CPUC for approvals. These projects will correct deficiencies and prepare the state for future growth. As Kern County seeks the capability to maintain and enhance its position as a major energy supplier to California, particularly in the realm of renewable resources, the availability of a robust electrical grid will be critical to success.

### Conclusion

The energy industry is expected to remain a major economic driver for Kern County for the foreseeable future. Oil and gas exploration, production, transmission and refining, as well as electrical generation, should allow the county to continue in its role as an energy exporter to the rest of the state. However, issues regarding public health and climate change are almost certain to dictate major changes in most aspects of the California energy industry. Local outcomes will probably include: significant impacts on the nature of oil and gas production activities; heavy gains in the use of renewable energy by public utilities; and strong support for additional development of renewable energy technologies in compatible areas of the county. The degree to which Kern County can maintain or improve its position as a leading energy generator will, in large part, be determined by the adaptability of its entrepreneurs and by the availability of improved access to distribution facilities, particularly the electrical transmission grid.

### Selected Information Sources

1. California Energy Commission website; <http://www.energy.ca.gov/>.
2. California Department of Conservation, Division of Oil and Gas website;  
<http://www.conservation.ca.gov/dog/Pages/Index.aspx>.

## SOLID WASTE [A]

### Solid Waste Management in Kern County

California's Integrated Waste Management Act (AB 939) was passed in 1989 because of concerns about the state's increasing waste stream and decreases in landfill capacity. As one result, the current California Integrated Waste Management Board (CIWMB) was established. AB 939 also created an integrated framework for program implementation, solid waste planning, and solid waste facility and landfill compliance. A disposal reporting system with CIWMB oversight was established, and facility and program planning were required. AB 939 mandated reductions in the amount of waste being disposed, with local jurisdictions tasked to meet diversion goals of 25% by 1995 and 50% by the year 2000. With the county's Waste Management Department (KCWMD) as lead agency, these requirements resulted in the 1996 creation and adoption of the *Kern County and Incorporated Cities Integrated Waste Management Plan* (KCIWMP or IWMP).

Over time and with the evolution of acceptable waste management technologies and strategies, the approaches employed by Kern County and its communities in meeting CIWMB requirements have undergone change to assure their functionality and cost-effectiveness. At the present time, the primary solid waste disposal infrastructure components serving the county's widely dispersed population consist of the following:

#### County of Kern Infrastructure

- 7 Active Landfills (SLF)
- 9 Transfer Stations (TS)
- 11 Recycling Drop-off Centers
- 2 Special Waste Facilities

KCWMD also manages eight inactive or closed landfills and forty-three closed burn dumps.

#### City of Bakersfield Infrastructure

- 1 Recycling and Composting Center

In the 2007/08 year, the KCWMD active facilities received a total of 896,426 tons of waste material, disposing of 822,051 tons of that total. County diversion programs resulted in the recycling of 117,938 tons of varied wastes in 2007/08; for 2006 (latest available data) the diversion rate in the unincorporated areas of Kern County was 62%. From all available indications the county's solid waste program is currently managed in an exemplary fashion, compliant with prevailing codes, standards and best practices. KCWMD has pioneered various techniques to conserve landfill capacity, such as focusing on compaction to maximize the density of landfill waste and using tarps in lieu of six inches of daily cover.

As of January 1, 2008, the existing county landfills were projected to provide 23.6 years of permitted capacity, and approximately 77.5 years of CEQA approved capacity. To complement that serviceability, a strong KCWMD public relations program is in place to advise citizens of their waste disposal options and opportunities. Departmental personnel seem very committed and task-oriented, pro-active in their service orientation and continued pursuit of new and cost-effective solutions.

While operating a considerably less diverse program than the county, the City of Bakersfield's Solid Waste Division (BSWD) appears to have developed a cutting-edge model operation at its 100-acre Mt. Vernon Recycling and Composting Facility. The BSWD installation has been historically successful in contributing heavily to the city's compliance with the AB 939 50% diversion requirement. However, in early 2008, a major upgrade was implemented at the site, as the existing diesel equipment configuration was replaced with a more comprehensive electrically-powered system in an effort to further reduce air pollution and greenhouse gas emissions, increase operational efficiencies, and provide capacity for future growth. The results have been substantial, leading the facility's receipt of a 2008 Composting Systems Excellence Award from the Solid Waste Association of North America (SWANA). For example, grinder capacity has been increased more than fourfold, to 800,000 cubic yards/hour; this and other changes have dropped the annual residue output to the county landfill from 7,614 tons to 1,075 tons, and more than doubled the outbound processed compost volume, to greater than 70,000 tons/yr. At the same time, NOx emissions have been essentially eliminated, and PM10 emissions reduced by a factor of four.



### **Emerging Issues in Solid Waste Management**

Good planning appears to be a feature of both KCWMD and BSWD management, although the relative scale may be different. Each organization is looking to the future and anticipating additional regulatory and public pressure shifting the solid waste management emphasis towards the CIWMB's stated goal of "zero waste." At the time of this ASCE assessment, neither organization seemed to anticipate any overwhelming issue that might interfere with planned progress. Nevertheless, both organizations did appear alert to possible unexpected future shifts in their funding and regulatory circumstances.

### **Kern County Waste Management Department Planning Projections**

KCWMD engages in extensive in-depth operational, physical and financial planning at a number of levels of detail. An excellent source of information on the county's planning for disposal infrastructure is the current (2004) version of the department's *Solid Waste Infrastructure Plan*, which bridges short term, medium term and long term planning horizons—the last extending to 2040. After discussing all known factors and requirements affecting disposal infrastructure development, the document presents a proposed policy structured to respond to those considerations and a schedule of future facilities management actions and activities designed to implement the policy. Associated with the *Plan* document are financial projections necessary to assure the plan's continued solvency; these are based on funding primarily derived from land use, gate and bin fees deposited in the county's Sanitary Waste Enterprise Fund for the exclusive use of KCWMD.

### **Bakersfield Solid Waste Division Planning Projections**

BSWD, as with KCWMD, is able to plan and implement programmatic additions and capital improvement projects based on funding from the division's fee-based enterprise fund. In fact, the proven effectiveness of the new Recycling and Composting Facility equipment complement has opened several new service avenues for exploration in the immediate future.

### **Regulatory Standards Compliance Activities**

Waste disposal strategies and their management constitute a subject area of considerable concern to regulatory agencies and to members of the general public interested in health and safety issues. KCWMD and BSWD activities and programs are therefore subject to intense scrutiny by a wide range of licensing and permitting authorities. For the 2007/08 year, the KCWMD records show the following:

<u>Reviewing Agency</u>	<u>No. Inspections</u>	<u>No. Violations</u>
(CIWMB) Local Enforcement Agency (LEA)	197	1
San Joaquin Valley Air Pollution Control District (SJVAPCD)	7	0
Regional Water Quality Control Board (RWQCB)	15	4

BSWD records indicate that the division received no violation notices in 2007/08, and both KCWMD and BSWD had clear records with CalOSHA. Previous historical data indicate that these excellent results are the product of continuous improvement efforts by both the city and the county. The two organizations seem well prepared to cope with any reasonable changes in their regulatory environment.

### **Conclusions**

Kern County's Waste Management Department has to date provided excellent leadership in assuring that the county's solid waste disposal infrastructure both meets the needs of local citizens and complies with the mandates of related legislation and regulatory agencies. These efforts have been very effectively supplemented in the Bakersfield metropolitan area by the City of Bakersfield's Solid Waste Division. Both organizations not only have developed substantial and cost-effective existing facilities but also have the long-range planning and financing in place to assure programmatic continuity. For these reasons, the local 2009 ASCE Report Card grade for Solid Waste has been determined to be "A." It is to be hoped that the recessionary economy prevailing in California will not lead to actions by state or local government that might have negative outcomes for these successful programs.

### Selected Information Sources

1. United States Environmental Protection Agency, *Municipal Solid Waste Generation, Recycling, and Disposal in the United States: Facts and Figures for 2006*.
2. Kern County Waste Management Department, *Kern County and Incorporated Cities Integrated Waste Management Plan—Summary Plan*, April 1996.
3. Kern County Waste Management Department, *2004 Solid Waste Infrastructure Plan—A Plan for the 21<sup>st</sup> Century*, January 2005.
4. Kern County Waste Management Department, *2007/2008 Annual Report*.
5. Kern County Waste Management Department, *2007-2008 Vision, Strategic Goals, Guiding Principles and 2006 Accomplishments*, (K.C. Internal Annual Report).
6. Kern County Waste Management Department, Internal Analyses:
  - a. *LEA Permitting Violations—FY 07/08*
  - b. *LEA Operating Violations—Summary by Fiscal Year*
  - c. *APCD Violations—FY 07/08*
  - d. *RWQCB Violations—FY 07/08*
  - e. *Solid Waste Enterprise Fund Pro Forma—No Metro Transfer Station*
  - f. *Capital Project Options* (06/07 through 18/19)
  - g. *Baseline Forecast of Closure Fund Contributions/Transfers to Retained Earnings* (06/07 through 16/17)
  - h. *January 2008 Capacity Study – Kern County Sanitary Landfills*, July 6, 2008
7. City of Bakersfield Solid Waste Division, Mt. Vernon Recycling and Composting Facility, *2008 SWANA Composting Systems Excellence Award Application Package*.

## WASTE WATER [B-]

### Waste Water Treatment Infrastructure in Kern County

Most of the populated area of Kern County falls within the Buena Vista/Kern Lake and the Tulare Lake drainage basins. These basins are closed aquifers, and most of the river flows from the mountain snowmelts are diverted for farmland irrigation through a complex series of interconnecting canals. The area also imports an enormous amount of water through the California Aqueduct and the Central Valley Project canals. Like much of the flow of the rivers in this region, most of the final effluent from wastewater treatment plants is utilized for direct discharge to irrigate high-valued feed and fodder crops. When crop water demands decrease in the fall and winter, evaporation and percolation ponds are also utilized for final effluent disposal. Because the drainage basins are closed systems, effluent makes its way into the local groundwater sources. The Central Valley Regional Water Quality Control Board (CVRWQB) monitors most of Kern County, but the Lahanton RWQCB oversees the desert regions.

Twelve communities in Kern County were reviewed as part of the local ASCE 2009 Report Card project. The plants associated with those cities generally perform well for their overall rated treatment capacity of 97 million gallons per day (mgd), currently yielding a total of some 59 mgd of wastewater flow. These existing wastewater flow service areas support approximately 80 percent of the county residents. Although collection systems were not evaluated for this report, the newly adopted state-wide Waste Discharge Requirements for sanitary sewer collection systems have deadlines, depending on the community size, affecting the majority of Kern County plants beginning in late 2008 and extending into 2010. To achieve compliance, plant managers must identify weak points in their collection systems and subsequently address them with improvements.

### Waste Water Regulation Issues

As the Regional Water Quality Control Boards update waste discharge requirements permits, they are setting nitrogen groundwater limits that essentially require that the facilities in question be converted to incorporate nitrification and denitrification treatment processes or retention of nitrogen leaching to the groundwater. The majority of Kern County plants currently do not include denitrification capabilities, and only a few are in the process of converting to that technology. The City

of Bakersfield is currently under construction with its \$217 million expansion of its Plant 3 facility, and when that project is completed, the plant will have the ability to meet nitrogen limits as well as address the projected organic loads in the service area. Some plants are in the planning process for implementing denitrification, while others have not approached the issue as their current permits do not yet require that capability. Current estimates indicate that an investment of approximately \$500 million over the next 10 years will be required for the plants in Kern County to address denitrification.

### **Infrastructure Demand Issues**

In addition to the issues associated with impending new permit requirements, the majority of wastewater processing plants in Kern County are now receiving waste flows with organic concentrations exceeding their original design standards. Such a migration to higher waste strength is a recognized phenomenon that occurs when the plant begins to service an increasing proportion of newer developments. The phenomenon is generally attributed to the provisions for increased water conservation typical of new developments, and also to the more widespread use of garbage disposals in such neighborhoods. However, no matter what the cause might be, most local wastewater plants are generally organically overloaded in terms of the ratio of actual to design flow strength. The assumption is that organic overload issues will be addressed as part of the \$500 million investment in denitrification technology.

It has been mentioned that there is a large seasonal demand in the region for treated wastewater to irrigate feed and fodder crops. The wastewater effluent for such crops only requires undisinfected secondary treated effluent by Title 22 regulations. Therefore, a most common and convenient strategy for effluent disposal has obviously been to provide irrigation for the feed and fodder crops during their growing season. As a result, there has been little pressure to provide tertiary treated water in Kern County. However, the City of Bakersfield's Plant 3 expansion includes a 2 mgd tertiary treatment capability for irrigating landscaping at an adjacent sports complex. This was driven by the proximity of the sports complex to the plant and the feasibility of disposing the projected wastewater flows.

A number of licensed sludge processing facilities have been developed in Kern County. With those facilities available, as well as many acres of farmland open to receipt of processed sludge, the wastewater treatment plants in the region do not face a problem with sludge disposal practices.

### **Conclusions**

Wastewater treatment facilities supporting Kern County residents are currently providing generally satisfactory services. However, a large investment in added plant infrastructure will be required over the next decade to address denitrification mandates and rectify growing organic overloads. In addition, further expenditures for new capacity to service incremental population growth will be needed, and the county's growth rate is among the highest in the state. Local governments must take cognizance of these essential requirements in their physical and financial planning, despite the pressures of a recessionary economy. In consideration of these several influencing factors, the grade assigned to the Waste Water element of this local ASCE Report Card assessment is "B-."

### **Selected Information Source**

Department of Water Resources, (draft) *California Water Update 2009, Chapter 8: Tulare Lake Hydrologic Region*.

## **DOMESTIC WATER [B-]**

### **Kern County's Infrastructure for Domestic Water Supply**

In general, Kern County citizens relied on locally available water sources until the 1950s. While limited by such factors as an annual average rainfall of approximately six inches per year and the availability of few storage facilities, seasonal surface and ground water sources were normally adequate to meet overall demands. Although water distribution for agricultural use was sometimes an issue of significant conflict in the county's early history, a sufficient supply was typically available for domestic consumption. However, as the county's population grew and more land was brought into productive use, both domestic and agricultural water demand increased markedly. In response, new sources were sought out, and imported water began to supplement the locally available supply. Today's residential, commercial and agricultural water usage in Kern County could

not be supported at their current levels without importation and the infrastructure network necessary to deliver the water. An important part of the data collection process employed in developing this section of this local ASCE Report Card was to send questionnaires to domestic water purveyors serving Kern County's residents. However, that survey was limited to residential and commercial consumption and did not address agricultural usage or demand, since different and much more complex parameters would be involved.

### **Emerging Issues in Domestic Water Supply**

Results derived from ASCE's survey of Kern County's domestic water purveyors indicated that the domestic water infrastructure is generally above average for the Bakersfield metropolitan area and similar large systems, but below average in several areas of the County served by more limited infrastructure. Water systems supporting metropolitan Bakersfield integrate the use of underground aquifer, Kern River and State Water Project sources, and therefore are much more likely to be able to maintain an adequate supply of good quality domestic water. Information provided in response to the survey indicated that distribution systems, storage capacity, and water quality and water availability in such locations were generally good. In addition, the providers involved generally had sufficient dedicated funding available for operations, maintenance and needed expansion and/or replacement of their systems.

Unfortunately, in many service areas outside of the Bakersfield metropolitan area, the domestic water systems often rely entirely on groundwater sources, and the absence of alternatives is of significant concern. Further, those same systems are frequently supported by aging distribution, storage and water treatment facilities; and very commonly, no funding mechanism has been identified for system maintenance and replacement or for future improvements. Obviously, significant investment will be required over the next 20 years to assure the continued functionality of these facilities, but in general, at least limited planning is in place to achieve that end.

### **Conclusions**

Review of survey responses from Kern County domestic water purveyors, as well as other available data, has resulted in the assignment of an overall grade of "B-" to the Domestic Water element of the local public service infrastructure. However, there are significant issues facing those water purveyors in the future, such as the reliability and adequacy of the State Water Project as a primary importation source, increasing water quality concerns, and for many smaller systems, numerous specific source and funding challenges. At present, most agencies are able to serve high-quality water and keep up with growth demands. Even so, the issues do remain, and must be addressed soon if Kern County is to be assured of an adequate and dependable long-term domestic water supply. Questions regarding the State Water Project must be resolved, and local purveyors must take steps to assure the availability of funding for required future infrastructure investments. In addition, local reliance on groundwater as a primary source must be contained within reasonable limits.

### **Selected Information Sources**

Completed surveys from 14 water providers/companies.  
Kern County Water Agency.  
Antelope Valley East Kern Water Agency.

## **SACRAMENTO-SAN JOAQUIN RIVER DELTA LEVEES [D]**

### **The Northern California Delta and Kern County's Water Supply**

The Sacramento-San Joaquin River Delta is an expansive inland river delta and estuary in Northern California, formed at the western edge of the Central Valley by the confluence of the Sacramento and San Joaquin rivers. It lies just east of where the rivers enter Suisun Bay (an upper arm of San Francisco Bay). The 1,100 square mile Delta consists of numerous small natural and man-made channels (sloughs), creating a system of isolated lowland "islands" and wetlands bordered by dikes or levees. The Delta's peat soil makes it one of the most fertile agricultural areas in California, contributing billions of dollars to the state's economy.



The Delta's extensive system of earthen levees, totaling about 1,100 miles in length, was in large part constructed by imported Chinese laborers considerably more than a century ago. It has grown randomly, to support wide-spread farming throughout the Delta and to control flooding, but maintenance and significant improvements over the years have been limited. Already growing concerns about the safety of levee resources in the Delta were exacerbated in 2004 by the Jones Tract Levee Break near Stockton, which flooded 12,000 acres. In addition to the age and marginal condition of the levee system in the Delta, it has been subjected to additional stress by gradual sea level rise, land subsidence and regional climate change. A major natural disaster, particularly one of California's frequent earthquakes, could easily result in catastrophic damage.

### **Ongoing Issues Affecting Kern County**

Unfortunately for Kern County water users, conditions affecting the Sacramento-San Joaquin River Delta—a geographic area hundreds of miles to the north—often have serious implications for most southern regions of the state.

### **Southern California's Dependence on Delta Water**

Some two-thirds of California residents and much of the state's huge agricultural industry rely on fresh water pumped from the Delta. This is certainly true for Kern County, which receives more than 20 percent of its water from that source in a normal year. In simplistic terms, one primary issue is that abundant clean water comes from the Sacramento River on the north and most of the demand is to the south; engineered conveyance through or around the Delta is one obvious solution to the problem. A peripheral canal has been considered for decades, but it was rejected by the state's electorate when brought to a vote in 1982—seemingly because residents of Northern California saw it a strategy for those in Southern California to acquire more of the North's water. Even if the peripheral canal were to be built, however, the physical and environmental concerns inherent in the Delta's weakening levee system and decaying ecology would remain unsolved, and thousands of residents in that region would remain at risk.

### **Inadequate State Response**

Reacting to the post-Katrina public outcry in California calling for attention to the Delta's levee problems, Governor Schwarzenegger declared a State of Emergency in February 2006. Various urgent repairs were initiated, and subsequently the California Department of Water Resources (DWR) was charged with conducting extensive geotechnical evaluations in several urban areas around the Delta to ascertain costs for repairing and upgrading the levees. The DWR evaluations may take as long as two or three years, funded from Propositions 84 and 1E. However, even this slow response would only address localized flooding concerns, doing little or nothing about resolving water demands in the southern part of the state.

### **No Comprehensive Solution in Sight**

Although discussions about solutions have been ongoing for decades, with such discussions now being rendered increasingly more urgent as new information about the seriousness of the situation emerges, no substantial program seems to be in place at this time for resolving the complex levee problems in the Sacramento-San Joaquin River Delta or for increasing the dependability of water export to southern California users. Any project intended to significantly repair or modify the Delta's levee complex will almost assuredly impact its sensitive (and failing) ecology, and the construction of a peripheral canal remains highly controversial—not to mention overwhelmingly expensive for a state in financial crisis. Further, local, state and federal environmental organizations and agencies expect to be closely consulted in reviewing any proposed new solutions, greatly increasing the immobility of the situation. Overall, the multitude of agencies involved appear to agree that action is needed, but none has advanced a viable plan of attack—and no acceptable funding source has yet been identified for what will certainly be the considerable cost of implementation.

### **Conclusions**

The Sacramento Section of ASCE, after careful review of the prevailing circumstances, published a 2006 Infrastructure Report Card for the Northern California levee complex giving it a "D" rating. Although some critical repairs have been

supported and various long-range studies have been authorized, it appears that the fundamental status of the levees has been little changed since that rating was issued. Viewing the situation from the perspective of water needs in Kern County and in consideration of the general welfare of the citizens of the state, the Southern San Joaquin Branch of ASCE concurs wholeheartedly.

#### **Selected Information Sources**

1. Wikipedia, *Sacramento-San Joaquin River Delta*, last updated September 3, 2008.
2. Popular Mechanics, *5 Questions for Geologist Jeff Mount on California's Crumbling Delta Levees*, April 10, 2008.
3. American Society of Civil Engineers, *Sacramento Section, 2006 Report Card for Northern California Infrastructure—Levees/Flood Protection*, February 2006.
4. Jack R. Benjamin & Associates, Inc./Resource Management Associates and Economic Insights, *Preliminary Seismic Risk Analysis Associated with Levee Failures in the Sacramento-San Joaquin Delta*, June 2005.
5. Business Wire, *DWR Geotechnical Levee Evaluations Under Way in Sacramento's Pocket Neighborhood*, February 21, 2008.
6. Jeffrey Mount and Robert Twiss, *Subsidence, Sea Level Rise, Seismicity in the Sacramento-San Joaquin Delta: Report to the Levee Integrity Subcommittee of the California Bay-Delta Authority Independent Science Board*, December 2004.

## **SCHOOLS [B-]**

### **School Facilities in Kern County**

ASCE representatives engaged in the assessment of Kern County's K-12 educational infrastructure for this report found that local educators clearly recognize the direct impact that the physical condition of their schools can have on student achievement, teacher retention and campus vitality. It was also obvious that the impact may well extend into the surrounding community, since school facilities often serve as centers for neighborhood activities. For these reasons, assuring that the institutions they operate are safe and well maintained usually ranks among the top priorities for knowledgeable campus and district administrators. This is no small task, since some 272 schools are located throughout the more than 8,000 square miles that comprise Kern County, although the largest percentage are within the Greater Bakersfield area. Unfortunately, a significant number of those schools—while in all likelihood safe and well maintained—are more than 25 years old and need upgrades and renovation to better facilitate student learning.

As is generally true across California, Kern schools receive funding from both state and local sources. In Kern County, residents have been extremely supportive of bond issues to build and upgrade schools, but state funding has lagged severely in recent years. Kern County also has experienced significant student growth. Since 1996, 52 new schools have been built in Kern County. More will be needed in the future as Kern's population continues to increase at a rate among the highest in California. Today, Kern educators serve more than 175,000 K-12 students.

At one time, California's public school systems ranked among the finest in the United States in almost all measures of educational quality, and many were seen as models for other states to emulate. Unfortunately, this is no longer true. For a number of reasons that need not be discussed in this report, but have been assessed at length in numerous studies by both professional educators and governmental analysts, California's school systems now are rated very low by most of the quality measures in which they once excelled. However, the state's lengthy and ongoing fiscal problems have clearly been an important factor in this loss of excellence, as its per capita expenditures for K-12 education have declined dramatically—including those for school facilities.

Kern County's schools have not been exempt from the general loss in quality, although local educational and community leaders have labored to maintain the status quo and are anxious to regain lost ground. To do so, such factors as untoward enrollment growth and aging facilities must be addressed in addition to any requirements for academic change.

The assessment of school facility infrastructure in Kern County for the purposes of this local ASCE Report Card review was conducted in large part through a survey of school facility chiefs. Requested input focused on the existing condition,

maintenance support and projected future capacity of school facilities within their respective purviews. Responses were received from 42 of the 48 school districts in Kern County, representing approximately 97 percent of Kern County's K-12 student population. For questions regarding the existing conditions of school facilities, fully 100 percent of respondents indicated that existing facilities were in "excellent," "good" or "fair" condition. However, inconsistent funding for deferred and routine maintenance was frequently noted as a matter of serious concern. More than half of respondents (54 percent) indicated that the current capacity of their facilities was inadequate to house projected enrollments, and almost two-thirds of respondents (61 percent) noted that their districts expect to ask voters to approve additional school construction and/or modernization finance measures within the next five years. The pattern of responses clearly delineated an overall need for additional funding for new and updated school facilities in Kern County.

### **Ongoing Issues in School Facilities Management**

The ASCE assessment disclosed no unexpected subjects of major concern relating to the operation and development of K-12 school facilities in the county, and most such subjects have already been mentioned in the preceding commentary for this section of the report. However, since the nature of the educational experience is so central to the quality of life in modern society, it seems worthwhile to emphasize at least three infrastructure issues of urgent concern.

#### **Inconsistent and Inadequate State Construction Funding**

State funding to build and renovate schools in Kern County—not to mention California in its entirety—is often inadequate and inconsistent. While voters have approved numerous state school construction bonds, statewide demand always outstrips the available funds. The lengthy and bureaucratic state approval process frequently results in an elapsed time of more than two years between the planning of a new facility and the initiation of its construction. In the meanwhile, students in growing school districts must be housed. A lengthy project time lag often forces school districts to place portable classrooms on their campuses, a generally expensive and often unsatisfactory solution to a space issue. The time lag also very often leads to increased construction costs when bids are finally received for the project.

#### **Inconsistent State Funding for Deferred maintenance**

The supposedly annual availability of state funding for deferred maintenance is generally dependent on the fiscal health of the state in a particular year, and on the state's typically politically-driven spending priorities for that year. It is very difficult for a school district to plan an effective deferred maintenance program in such an uncertain fiscal environment. When shortfalls in state funding occur, it is often necessary for school districts to turn to their operating budgets for maintenance necessary to assure the safety and operability of their classrooms; and those local funds could better be spent to address instructional priorities.

#### **A Large Needed Investment**

To raise K-12 school infrastructure development in Kern County to a higher grade than that given in this report will require approval of additional local school construction measures and increased state funding to keep pace with anticipated increases in student enrollment and with the need to upgrade older schools. Enrollment increases in the next five years are currently projected at over 14,000 new students; and nearly 4.2 million square feet of more than 20-year-old facilities are in need of improvements in school districts across the county. The total amount of state and local funds required for school facilities county-wide over the next five years is estimated at \$1.25 billion.

### **Conclusions**

The final grade for Kern County's K-12 school facility physical infrastructure is a "B-." It must be emphasized that this assessment refers only to the current status of that infrastructure, and is in no way a commentary on the instructional programs offered in those schools. ASCE's evaluation of the situation indicates that local voters have been relatively generous in supporting the cost of improvements to their K-12 facilities, but the same cannot be said of California's state government, which appears to remain in a constant state of financial crisis. What the future holds for school infrastructure in Kern County—or in California, for that matter—is difficult to predict. However, if the state seeks to recapture the educational excellence that was a fundamental driver of its economy in previous years, some form of fundamental change at a very early

date seems very much in order.

### **Selected Information Sources**

ASCE, *2005 Report Card for America's Infrastructure*, 2005.

ASCE, Policy Statement 452, 2003, *Investing in America's Schools*, 2005.

USHR, Testimony of Kathleen J. Moore, Director of School Facilities Planning Division, California Department of Education, Committee on Education and Labor, United States House of Representatives, *Modern Public School Facilities: Investing in the Future*, dated February 13, 2008.

## **PARKS [C-]**

### **Infrastructure for Parks and Recreation in Kern County**

There are at least 14 public park and recreation districts and departments that provide services within Kern County, and several have extensive responsibilities. Kern County's Park and Recreation Department manages and operates more than 15,000 acres of regional parks including those at Lake Woollomes, Lake Evans, Lake Webb, Lake Isabella and Lake Ming. That department also manages 39 neighborhood and community parks and 27 public buildings. Similarly, the City of Bakersfield supports over 50 parks, recreational facilities and trails such as the Kern River Parkway. North of the River Recreation and Park District operates an additional 21 park and recreational facilities in the northern Bakersfield metropolitan area. Overall, a wide range of park and recreational facilities is available in Kern County, including golf courses, camp sites, wildlife reserves, lakes, regional and neighborhood parks, tennis and basketball courts, ball fields, swimming pools and spray parks, community and multi-use facilities, and a regional bike path.

Research has shown that providing adequate recreational facilities that are well planned, well funded and well maintained sends a message to a community that can have far-reaching effects on crime rates, community enrichment, health and wellness, and quality of life for future generations. Park and recreation agencies in Kern County have done a generally excellent job, despite a lack of available funding for facilities maintenance and improvements. This success is due in large part to the dedication of staff committed to community service. Many agencies also rely on volunteers and support from the community to continue to provide the services that are needed. In recent local public opinion polls, most participants indicated satisfaction that park facilities in the county are maintained in "good condition."

Much of the data collected for the local ASCE Report Card assessment of park and recreation infrastructure in Kern County came from the results of an e-mailed survey directed to the districts and agencies responsible for that infrastructure. This focused on such factors as existing condition, maintenance provisions and future capacity projections for the facilities in question. Eight of the 14 Park and Recreation Agencies, representing some 95 percent of Kern County residents, responded to the survey.

### **Emerging Issues in Park Management**

The ASCE assessment disclosed several major areas of concern relating to the operation of park and recreation facilities in the county.

### **Financial Support**

The most significant financial issue facing local park and recreation agencies is the loss of annual tax revenue due to the California Legislature's action in shifting property tax revenues from local governments to the state and the Educational Revenue Augmentation Fund (ERAF). This action has had devastating impacts on the ability of local agencies to provide services and maintain and improve their existing facilities. Consequently, the County of Kern, as well as communities and districts within the county, traditionally accustomed to funding their own parks and recreation resources, have had to turn towards alternative and often somewhat creative funding sources. These include: developer land dedications for open space and parks (Quimby Act); designated park impact or developer fees (fees assessed on dwelling units and/or commercial

development); and special assessment districts. None of these are welcome strategies in a state undergoing a lengthy fiscal crisis.

Despite any positive history of past performance, local park and recreation agencies throughout the state are likely to continue to face difficulties in building and maintaining new neighborhood or community park and recreational facilities and in replacing and/or upgrading existing resources of that nature. Creative funding strategies can be expected to supply only a portion of the overall investment needed to maintain the current infrastructure and to meet projected future demands. Further, public opinion in Kern County regarding reliance on developer funding is also shifting, as shown by a recent poll on the subject which indicated that most respondents (53 percent) were “somewhat or definitely against” a large increase (up to 200 percent) in developer impact fees.

#### Condition of Existing Facilities

Even though the public opinion polls mentioned earlier may have suggested the county's citizens are reasonably satisfied with their recreational facilities, the results of ASCE's e-mailed survey presented a somewhat less positive perspective. While fully 100 percent of district and agency respondents indicated that their existing facilities were currently in “excellent,” “good” or “fair” condition, various respondents noted the extreme age of some park and recreation facility infrastructure and a requirement for “very urgent” repair and updating. Irrigation systems that are 30 to 40 years old and inadequate play fields and playground equipment were frequently mentioned. Typically, lack of available funding for routine maintenance and upkeep of existing facilities and to meet projected demands were recurrent response themes. Nearly all respondents indicated that the current facilities are “inadequate” to meet future projected population growth.

#### Compliance with Established Standards

While parks and recreation agencies in Kern County have established a considerable record of success in responding to local needs in the face of extreme funding limitations, yet another substantial resource issue confronts them. In many cases, existing facilities do not meet the minimum standards for public recreational facilities established by the National Recreation and Park Association (e.g., number of facilities or acres per 1,000 residents or number of facilities within walking distance). Thus, despite extreme efforts by the local agencies, parks and other public recreational resources across the county can be judged in many instances to be insufficient in numbers, sub-standard in equipment and poorly located for optimal service. These conditions obviously are primarily a by-product of continued insufficient funding, but they may, to some degree, also reflect less than adequate community planning. In a county seriously concerned with maintaining and improving the quality of life for its citizens, achieving compliance with national standards is not an idle goal.

#### Needed Investment

It is currently estimated that the funding needed for improving the county's Parks to the level of a “B” grade would exceed \$1.0 billion expended over the next 10 years, or an annual investment of more than \$100 million. This estimate includes costs for acquisition of new park land and construction of needed capital improvement projects, as well as for routine operations and maintenance. In consideration of the fiscal crisis currently confronting the state and local governments in California, closing this large gap in Parks funding obviously represents just one major challenge among many; however, it is a quality of life issue that also cannot be long ignored.

#### Conclusions

The final grade assigned for the Parks element of Kern County's public service is a “C-.” This evaluation should not be viewed as a criticism of the efforts of the district and agency personnel responsible for management of the parks and other recreational facilities across the county, who have apparently worked conscientiously within the resources available to them. Instead, the grade is a reflection of the inadequacy of those resources and the need for funding agencies to address such issues for the long term.

#### Selected Information Sources

City of Bakersfield, *Recreation and Parks Master Plan 2000-2005*, January 2000.



City of Bakersfield, *Recreation and Parks Master Plan*, 2007.

McFarland Recreation & Park District, *Recreation and Parks Master Plan for the McFarland Recreation & Park District*, adopted April 28, 2008.

North Bakersfield Recreation & Park District, *2010 Park and Recreation Master Plan*, 1995.

Kern Council of Governments, *Phase One Report—Community Outreach, Kern Regional Blueprint Program*, September, 2007.

Kern Council of Governments, *Phase Two Summary Report—Community Outreach, Kern Regional Blueprint Program*, May 2008.

## AIRPORTS [B]

### The Airport Infrastructure Serving Kern County

#### Existing Aviation Facilities

Kern County's regional airport system includes a diverse range of aviation facilities. It is comprised of seven airports operated by the Kern County Department of Airports, four municipally owned airports, three airport districts, two privately owned public-use airports, and two military facilities. Scheduled air carrier and commuter airline service is provided at Meadows Field, which serves metropolitan Bakersfield and surrounding communities. Scheduled commuter services are also provided at Inyokern Airport, which serves communities in the Mojave Desert and eastern Sierra regions. General aviation needs are served by public use airports, both publicly and privately owned, throughout the County. The physical and operational characteristics of the non-military facilities are summarized in Tables 3 through 5.

The county is also home to two military aviation installations of great significance to national security. China Lake Naval Air Weapons Station (NAWS) and Edwards Air Force Base (EAFB) are located in an area referred to as "the R-2508 complex," which is used for the advancement of weapons systems technology and tactical training. The R-2508 complex consists of several restricted airspace areas; it is approximately 110 miles wide and 140 miles long, and covers some 20,000 square miles in eastern Kern, San Bernardino, Los Angeles, Ventura, Tulare, and Inyo counties. However, the nature of operations conducted within this airspace creates a flight hazard to non-military aircraft. In addition to NAWS and EAFB, other military installations use this air space, including Fort Irwin Military Reservation near Barstow and Air Force Plant 42 at Palmdale.

#### Airport Infrastructure Needs and Issues

##### Demand

In general, demand for aviation services appears to be met within Kern County. Most of the capital improvement projects for Kern County airports focus on maintenance of existing runways and taxiways, with an occasional need to improve navigational aids. Potential future demands of particular interest to local airport planners include:

- Possible designation of Meadows Field as a reliever airport for LAX, which is seen as approaching saturation;
- Additional development of automated above-ground fueling systems at smaller airports to enhance operational efficiency and extend services; and
- Improvement of navigational equipment through use of GPS technology to facilitate ILS approaches.

##### Ground Access and Intermodal Connectivity

Assuring that transportation infrastructure is configured to maximize the intermodal connectivity of key passenger resources such as regional airports and transit and rail facilities should be an understood goal of transportation planners at all levels. Meadows Field, the primary regional facility for metropolitan Bakersfield and the southern San Joaquin Valley, currently has good access to State Route 99. Further federally-funded improvements to this access are scheduled, but more may be needed if the airport becomes an overflow facility for Southern California air traffic. A requirement may develop for a transit shuttle, bus rapid transit, light rail, or spur connection between downtown Bakersfield and the airport for better connectivity with the existing Amtrak and the projected high speed rail terminals in downtown Bakersfield. Inyokern Airport functions as the regional service provider to the Ridgecrest/Indian Wells Valley in northeast Kern, but ground access to that facility is

adequate for the foreseeable future.

Air taxi traffic to smaller airports could increase in the future, as GPS and other technologies facilitate booking a small aircraft in flight for point-to-point service. For example, corporate jets are increasingly supplementing their funding by using such technologies to pick up additional travelers headed in the same direction. If this traffic were to develop into an industry, an increased demand for vehicle/transit/rail access to existing smaller airports could result. Efforts should be made to preserve and maintain access to all civilian airports in the region, and to expand that access as needed.

#### Airport Land Use

Many of Kern County's public access airports are in agricultural or urban fringe areas now subject to significant growth in residential, commercial or industrial uses, and assuring that uses in the immediate vicinity of the airports are compatible with flight operations has become a challenging task as growth-related pressures increase. Noise issues are becoming a particular concern at some facilities, since conflicts over noise are an early indicator that an airport is facing the broader issue of urban encroachment. Noise contour maps have been prepared through various programs for all of the airports in Kern County, using the FAA Integrated Noise Model. Noise analysis has been part of developing a master plan for each of the more active airports, and a Comprehensive Land Use Plan has been prepared for all Kern County airports that includes land use analysis, noise contours, airspace plans and layout plans.

#### Recent Aviation Planning and Development Activities

The new Meadows Field William M. Thomas Air Terminal was opened in February, 2006. The building currently accommodates up to six jet-boarding gates, and to meet future air service demands, can be expanded through additional construction to add as many as 18 more gates. Ground area to accommodate additional parking facilities has been reserved.

The Department of Airports anticipates the following activities over the near-term:

- At Meadows Field—
  - Complete renovations to the Customs and Borders office (former terminal);
  - Continue marketing Meadows Field for international air cargo service;
  - Upgrade the lights and signs for Runway 30R;
- At Other Facilities—
  - Initiate environmental review and project approvals for the Meadows Field, Wasco, Lost Hills and Kern County Airport Master Plans.

In June 2004, East Kern Airport District/Mojave Airport became the first civilian airport to be certified as an inland spaceport by the FAA. Later in 2004, aircraft manufacturer Scaled Composites launched their first sub-orbital aircraft from Mojave Airport, initiating the age of privately-owned manned space programs.

#### Homeland Security

The Department of Homeland Security has made airport security a top funding priority. Meadows Field and Inyokern airports have constructed security fences and staffed security checkpoints to improve passenger-boarding security and reduce threats of terrorism. It is imperative that Kern County's public access airports meet all Homeland Security directives.

#### Proposed Actions

The Kern County Department of Airports includes the following among its high-priority goals:

Near-Term 2007-2010:

- To work with Meadows Field and Inyokern Airport to obtain funding from the state and federal governments for their respective development programs;
- To work with local and regional transit providers to increase alternative mode ground access options at Meadows Field;
- To assist Meadows Field with planning related to high-speed rail connections; and
- To work with public airports to increase their access to state and federal funds.

Long Term, 2012-2030:

- To continue to work with the public access airports to increase their access to state and federal funds;
- To update the Regional Transportation Plan to be consistent with the California Aviation System Plan, and regional aviation systems plans, as necessary;
- To implement the Action Plan of the Central California Aviation System Plan; and
- To participate in Master Plan updates for various Kern County airports.

**Conclusions and Recommendations**

After extensive review of the existing Kern County aviation infrastructure and related planning and development activities, it was concluded by the report card committee that the facilities comprising that infrastructure are currently in generally sound condition. Further, it appears that they have the potential to continue that serviceability if sufficient resources are made available, but concerns do exist that funding shortfalls may occur as a result of the present recessionary economy. The committee also notes that local airport management would be greatly facilitated if the following governmental actions were to occur:

- Enact the Second Century of Flight Act (H.R. 2271 & S. 788);
- Permit increases in Passenger Facilities Charges (PFC) above the current \$4.50;
- Streamline the environmental permitting process by running federal and state environmental impact assessments simultaneously to speed new runway construction; and
- Modernize the Air Traffic Control System.

**Selected Information Sources**

Kern Council of Governments, *2007 Regional Transportation Program*.  
Kern Council of Governments, *Regional Aviation System Plan*, September 1994.  
Kern Council of Governments, *Regional Aviation System Plan, Financial Element*, September 1995.  
Kern Council of Governments, *Airport Land Use Compatibility*, March 1990.  
Kern Council of Governments, *Environmental Impact Report to Regional Transportation Plan*, May 2007.  
Kern County Department of Airports, *Kern Valley Master Plan*, April 2006.  
Kern County Department of Airports, *Lost Hills Master Plan*, November 2006.  
Kern County Department of Airports, *Wasco Master Plan*, November 2006.  
Kern County Department of Airports, *Meadows Field Master Plan*, July 2006.  
City of Delano, CA, Official Website—Airport Planning, <http://cityofdelano.org>.  
City of Delano, CA, *Delano Municipal Airport Master Plan Update*, October 1992.

**Table 3**  
**Summary of Infrastructure Characteristics for County of Kern Airports**

<b>County of Kern Airports</b> Characteristics of Kern County's public access airports vary significantly, from their size and number of operations to their types of activities and to their expected growth and impact on their local economies. As a group, the airports combine a range of services designed to meet the passenger, business, agricultural, recreational and emergency service needs of the region. The seven publicly-owned airports operated by the County of Kern are typical of this diversity.					
<b>Airport</b>	<b>Size/Location</b>	<b>Activities</b>	<b>Runway(s)</b>	<b>Operations/Storage</b>	<b>Services/Other</b>
<b>Meadows Field</b>	1,107 acres located four miles northwest of central Bakersfield.	Commercial	Two parallel runways. The main runway is 10,857 feet in length.	Full range of passenger services.	Active general aviation airport with numerous Kern-based corporations.
<b>Elk Hills/ Buttonwillow Airport</b>	216 acres located near the intersection of Interstate 5 and Route 58.	Small aircraft only.	3,260 foot runway.	Unlighted runway and paved tie-down space for twelve aircraft.	Seasonal agricultural aircraft and personal aviation.
<b>Kern Valley Airport</b>	270 acres leased to Kern County from the National Forest Service and located south and east of the community of Kernville.	Commercial, recreational, and occasional fire suppression activities in the Lake Isabella/Kern River Valley area.	3,500-foot runway.	15 hangar spaces and 30 aircraft tie-downs.	Gasoline sales, a fixed-base operator and a restaurant.
<b>Lost Hills Airport</b>	390 acres located near the intersection of I-5 and Route 46 near the community of Lost Hills.	Small aircraft only.	3,020-foot runway.	Four hangar spaces and 12 aircraft tie-downs.	Local and regional agricultural, business, and personal aviation needs in northwestern Kern County. It is an important base for agricultural aircraft operating over the area's extensive cropland.
<b>Poso Airport</b>	400 acres approximately 20 miles north of Bakersfield.	Small aircraft only.	3,000-foot runway.	20 aircraft tie-downs.	Used primarily for agricultural and training aircraft.
<b>Taft Airport</b>	71 acres located one mile east of Taft.	Serves business and personal aviation needs for the City of Taft and southwestern Kern County.	3,550-foot runway. Poorly designed.	The airport has 22 T-hangars, five hangar spaces and 18 aircraft tie-downs.	Although significant demand exists for an airport in this locale, the configuration of the existing runway complex has long been considered unsatisfactory; and Kern County is evaluating available options for major improvements to the facility.
<b>Wasco Airport</b>	158 acres located one mile north of Wasco and 22 miles northwest of Bakersfield.	Serves agricultural, business, and personal needs for its immediate area.	3,380-foot runway.	Aircraft storage consisting of 11 T-hangars, four hangar spaces, six shelters and 36 tie-downs.	The draft master plan for the airport includes recommendations for land acquisition and runway extension, added weather observation equipment, and improved aircraft guidance provisions.

**Table 4**  
**Summary of Infrastructure Characteristics for Municipal Airports in Kern County**

<b>Municipal Airports</b> In addition to the airports operated by Kern County, four airports are owned and operated by municipalities located in three geographic sub-regions of the County. In the San Joaquin Valley, the Cities of Bakersfield and Delano operate municipal airports. The City of Tehachapi operates a municipal airport in the mountain area, and California City Municipal Airport is located west of that desert community.					
<b>Airport</b>	<b>Size/Location</b>	<b>Activities</b>	<b>Runway(s)</b>	<b>Operations/Storage</b>	<b>Services/Other</b>
<b>Bakersfield Municipal Airport</b>	183 acres located in southeast Bakersfield	Serves business, personal, and recreational aviation needs in its metropolitan area.	4,000-foot runway	Aircraft storage consisting of approximately 50 hangar spaces and 60 tie-downs.	The airport has recently completed an ambitious development program, including land acquisition and construction of the 4,000-foot runway, associated taxiways, and support facilities.
<b>California City Municipal Airport</b>	203 acres located northwest of California City approximately eight miles east of Route 14 and two miles north of California City Boulevard.	General aviation activities, especially recreational aviation.	6,035-foot runway with medium-intensity lighting and a 5,010-foot parallel taxiway.	Aircraft storage consisting of 10 hangar spaces and 40 tie-downs.	Two dirt glider landing strips and a parachute drop zone is located $\frac{3}{4}$ mile south of the airport.
<b>Delano Municipal Airport</b>	546 acres located just east of Route 99, approximately two miles southeast of central Delano.	Extensive crop dusting and helicopter operations, as well as ultra-light activities.	5,650-foot main runway and a 3,500-foot secondary runway	Aircraft storage consisting of 14 hangar spaces, 6 shelters, 13 port-a-ports, and 53 tie-downs.	Many military, air charter, air ambulance, and other flying services operate from the Airport on a regular basis.
<b>Tehachapi Municipal</b>	264 acres located between Route 56 and Tehachapi Boulevard.	General aviation airport providing business, personal and recreational aviation services.	4,035-foot runway	Aircraft storage consisting of 89 hangar spaces and 20 tie-downs.	It is adjacent to the Union Pacific Railroad, but a spur into the airport is not currently available.



**Table 5**  
**Summary of Infrastructure Characteristics for Airports Operated by Airport Districts in Kern County**

<b>Airport Districts</b> Three airport districts operate in Kern County; each is organized as a special district, with a board of directors and an airport manager. Minter Field is located within the City of Shafter. East Kern and Indian Wells airport districts are in eastern Kern County.					
<b>Airport</b>	<b>Size/Location</b>	<b>Activities</b>	<b>Runway(s)</b>	<b>Operations/Storage</b>	<b>Services/Other</b>
<b>Indian Wells Airport District/Inyokern Airport</b>	1640 acres located northwest of the small community of Inyokern.	Serves the China Lake Naval Air Weapons Station, Inyokern itself and the City of Ridgecrest with scheduled airline service to Los Angeles International. It also serves local general aviation needs for personal, business and recreational flying.	Three runways, respectively 7,344, 6,275 and 4,153 feet in length	Aircraft storage consisting of 70 hangar spaces and 90 tie-downs.	Fixed-base operators provide fueling, maintenance and flight instruction services at the airport, while Skywest currently offers three daily flights to LAX. Federal Express provides air cargo service, moving over 500 tons annually. Other activities at Inyokern include based and itinerant soaring activity, annual air shows, film production, and Sheriff's Department search and rescue activities.
<b>East Kern Airport District/Mojave Airport</b>	2998 acres located northeast of the community of Mojave and is within one mile of Routes 14 and 58	The airport serves as a civilian testing and development center for business, military, civil, and home-built aircraft, as well as a base for modification of major military and civilian aircraft.	Three runways, respectively, 9,600, 7,040, and 4,900 feet in length.	Aircraft storage consisting of 676,300 sq. ft. of hangar spaces varying in size and 74 tie-downs.	Offers fixed-base operator facilities for airport users from Edwards Air Force Base, Rosamond, Mojave, Tehachapi, California City, and Boron. Also has rail spur from Union Pacific Railroad leading directly into the airport.
<b>Minter Field Airport District/Shafter Airport</b>	1206 acres located at the junction of Route 99 and Lerdo Highway.	Heavy crop duster activity and ultra-light activity.	Two runways, 4501, and 2972 feet in length.	Aircraft storage consisting of approximately 89 hangar spaces and 80 tie-downs.	The airport also owns three miles of rail spur connected to the Union Pacific railroad.

## ROADS [D]

### Kern County's Road Infrastructure

A summary by jurisdiction of the mileage comprising entire public roadway network in Kern County is shown in Table 6; the data are from a 2008 report compiled by the California Department of Transportation. Also shown in that table are projections of the miles traveled in each jurisdiction. For purposes of this ASCE Report Card assessment, Kern's roadway network has been sub-divided into two distinct categories, "Roads" and "Highways," and each category is discussed in a separate section of the report. "Roads" are those lesser city streets and county roads constituting the local access component of the network, while major arterials and expressways or portions of the federal and state highway systems are defined as "Highways."

In the Roads category, planning, construction and maintenance for a specific roadway are the responsibility of the governmental entity having jurisdiction over the geographic area within which that roadway is situated, although communication and cooperation between abutting jurisdictions is obviously essential. The Kern Council of Governments (Kern COG) plays a coordinative role in some aspects of such matters, but inter-jurisdictional interaction remains of paramount importance in project implementation.

Kern County's large size, diverse topography, wide-ranging climatic profile, central geographic position in the state, and (currently) light population density combine to create unusually difficult problems for its city and county governments as they attempt to meet the roadway construction and maintenance needs of their constituents. Kern is the third largest county in the state, with the second longest system of roads—over 3,300 miles. The county's largest city, Bakersfield, contains about 1,100 miles of streets, and the ten other incorporated cities have a total combined street mileage approaching 1,150.

In addition to local traffic pressures, Kern's crossroads location in California imposes an unusually large—and rapidly growing—increment of through traffic demand on its somewhat marginal highway network. This demand often results in overflows onto already challenged feeder roads and streets, particularly in the Bakersfield metropolitan area. In 2007, congestion delays are believed to have cost Bakersfield citizens 3.3 million hours and \$73 million.

#### Ongoing Issues in Roadway Maintenance and Development

Kern COG's 2007 *Regional Transportation Plan* (RTP) indicates that the Kern region may experience funding deficits aggregating approximately \$2.3 billion to operate, maintain, and rehabilitate its existing transportation system over the RTP's Destination 2030 timeframe. Given that environment, the situation for local governments in Kern County with respect to funding for roadway development and maintenance is simple, albeit depressing: the estimated overall costs for required projects greatly exceed the amounts available from impact fees, state fuel tax allocations, and local tax sources. That situation is further exacerbated by California's economic difficulties and by Kern's recently accelerating population growth rate.

#### Inadequate Local Support for Roadway Development

The County of Kern and all other local governments have been struggling in recent years with pervasive budgetary problems engendered at first by California's deepening fiscal crisis and then worsened by the nation's current recessionary slump. As a result, street and road construction funding has diminished almost to the vanishing point. Traditional funding sources have become increasingly undependable: developer impact fees have been dramatically reduced as the state and national housing finance crisis has swept over the country; California's fuel tax income has dropped significantly as a reflection of reductions in user per capita mileage resulting from spiraling petroleum costs and pressures to employ alternate energy sources; and local tax revenues not only have dropped because of recessionary impacts on taxpayers, but also have experienced greater pressure because of the other budgetary losses.

Traffic impact fees have traditionally been a major source of roadway improvement funding for Kern County local governments. This dependence extends to support for transportation-related bond sales. Examples of current projects which may include such funding are work on Twisselman Road and on Holloway Road, as well as a railroad grade separation at Hageman Road and Santa Fe Way. However, both the City of Bakersfield and the County of Kern have recently experienced major pressure to find matching monies for key major highway projects involving large state and federal investments (see Highways section of this report). Should it prove necessary to divert significant amounts of source-limited impact fee revenue for such purposes, the losses in needed local street and road construction, operation and maintenance would be more than significant.

Many of the necessary improvements in the local public roadway network could be completed with funding from a self-imposed transportation sales tax in Kern County. Unfortunately, such a sales tax—to make Kern a “self-help” county—has been defeated by voters twice in the past, most recently in November 2006. Self-help counties have the potential to deliver projects more rapidly because they are not solely dependent on their typically inadequate internal general fund allocations or on undependable external governmental funding programs. Although the strategy is most commonly associated with “highway” projects, there might also be opportunities to leverage additional state and federal funds for local roads if matching monies were available from a self-help transportation sales tax measure. Kern County’s inability thus far to pass such a measure places it in a disadvantaged position among California’s counties and greatly limits its access to significant levels of available external resources.

#### Inconsistent and Inadequate Funding for Maintenance

As has been the case with new roadway construction in Kern County, in recent years local government maintenance budgets have generally lagged far behind basic support needs. This budgetary pattern has prevailed despite the well-known fact that deferring roadway maintenance and improvement expenditures only increases the ultimate upkeep costs that must eventually be paid. Studies have shown that \$1 spent on timely maintenance typically saves \$5 to \$10 in later reconstruction costs.

It has already been noted that Kern County is the third largest county in the state, with the second longest system of roads—over 3,300 miles—to be maintained. Currently 57% of the County’s roads are rated “poor.” The Kern County Roads Department received no funding at all for road maintenance from 1992 until 2004, and the County engineering staff estimates that at least a \$200 million maintenance and improvement deficit now exists. The County currently spends \$16 million per year on road maintenance, but it is projected that a minimum of \$20 million per year is needed to incrementally bring the “poor” rating up to a “fair” rating in 30 years.

The City of Bakersfield, by far the largest incorporated community in Kern County, has over 350 miles of arterial and collector streets, with approximately 10% of these being in poor condition. In recent years, the City has been spending \$12 million per year on street maintenance. City staff estimates that a \$100 million maintenance deficit now exists, amounting to over a ten-year backlog. Under current funding conditions it is believed that road conditions will continue to degrade.

The results of a 2007 poll by the Kern COG staff indicate that the ten smaller incorporated cities in Kern County also have serious deferred roadway maintenance backlogs. The poll yielded data suggesting that those ten cities had maintenance budgets totaling some \$10 million, with a combined backlog of perhaps \$130 million and a need for nearly \$15 million per year for its gradual elimination.

#### Conclusions

As a large, relatively lightly-populated “crossroads” county in California, Kern does have somewhat unique problems in funding the construction and maintenance of the local access roadway component of its public transportation network. These problems have been compounded by the national economic recession, California’s ongoing fiscal crisis, and county taxpayer unwillingness to support “self-help” status. Should Kern eventually adopt a local sales tax measure earmarked for its transportation infrastructure needs, some portion of that income would presumably be available to local governments for roadway maintenance. Until that time, however, it appears likely that highly-justified roadway routine maintenance, reconstruction, hazard elimination, and resurfacing projects across the county will continue to be stalled by budgetary limitations.

#### Selected Information Sources

1. Kern Council of Governments and Kern Transportation Foundation, *Roads to Ruin, Transportation Funding Options for Kern County*, January 2002.
2. State of California, Department of Transportation, *2008 California Public Roads Data*, December 2009.
3. Office of the California State Controller, *Streets and Roads Annual Report for 2006/07*, September 2008.
4. County of Kern website, <http://www.co.kern.ca.us/>, Roads sub-section.
5. Kern Council of Governments (Kern COG) website, <http://www.kerncog.org/cms/transportation>, Transportation sub-section.

**Table 6**  
**Summary of 2008 Roadway Miles and Miles Traveled in Kern County by Jurisdiction\***

Jurisdiction	Maintained Miles			Daily Vehicle Miles of Travel (DVMT) [in 1,000s]		
	Rural	Urban	Total	Rural	Urban	Total
Cities:						
Arvin	0.00	37.25	37.25	0.00	76.99	76.99
Bakersfield	15.68	1,034.89	1,050.57	5.49	4,152.22	4,157.70
California City	2.22	599.79	602.01	0.78	384.52	385.29
Delano	10.33	89.41	99.74	4.37	173.85	178.21
Maricopa	10.94	0.00	10.94	3.65	0.00	3.65
McFarland	2.50	23.35	25.85	3.15	31.93	35.08
Ridgecrest	0.00	125.16	125.16	0.00	225.71	225.71
Shafter	0.78	72.90	73.68	3.84	150.90	154.74
Taft	0.00	42.69	42.69	0.00	51.81	51.81
Tehachapi	0.00	47.80	47.80	0.00	91.29	91.29
Wasco	9.05	56.71	65.76	4.86	63.15	68.01
Other:						
Army Corps of Engineers	6.00	0.00	6.00	0.42	0.00	0.42
Bureau of Indian Affairs	1.20	0.00	1.20	0.07	0.00	0.07
County of Kern	2,546.09	781.58	3,327.67	1,604.39	1,861.03	3,465.42
Department of Defense	40.00	6.12	46.12	2.80	17.49	20.29
State Highway	725.55	147.95	873.49	9,047.70	4,248.72	13,296.41
State Park Service	6.52	0.00	6.52	0.59	0.00	0.59
U.S. Fish and Wildlife Service	6.15	0.00	6.15	0.18	0.00	0.18
U.S. Forest Service	109.03	0.00	109.03	5.36	0.00	5.36
<b>Kern Total</b>	<b>3,492.03</b>	<b>3,065.60</b>	<b>6,557.63</b>	<b>10,687.64</b>	<b>11,529.59</b>	<b>22,217.24</b>

\*Source: State of California, Department of Transportation, 2008 California Public Road Data

## HIGHWAYS [D]

### Highway Infrastructure in Kern County

As has been mentioned in the Roads section of this report, for purposes of this ASCE Report Card assessment, “highways” are defined as major arterials and expressways or portions of the federal and state highway systems, and they have been considered as being in a distinct category separate from local city and county roads. State highways are maintained by the California Department of Transportation, and that department also manages federal subventions for maintenance and improvement of those portions of the Interstate System lying within the state’s boundaries. Kern County is part of Caltrans’ District 6, which also includes Madera, Fresno, Kings and Tulare counties. The state highway mileage in Kern is by far the greatest of the five counties, amounting to about 43% of the five-county total of approximately 2,050 centerline miles.

Much of the work to maintain, repair and rehabilitate state highways is done under the State Highway Operation and Protection Program (SHOPP). As is true of all other state-funded programs, the SHOPP budget has been severely constrained by the state’s fiscal crisis, and highway maintenance across California has suffered as a result. Local city and county governments may build and support highways within their own jurisdictions, of course; however, in doing so, they generally accept the maintenance responsibility for those facilities.

Unfortunately, the need for attention to California’s highway infrastructure is not limited to just maintaining the aging system that currently exists—there also is an urgent need to upgrade and improve the highway network to meet future demand. These circumstances certainly prevail in Kern County, which has one of the fastest-growing populations in the state and is further subject to huge through-traffic demands as a consequence of its geographic crossroads location. For example, despite rapidly increasing traffic volumes, there has been no new freeway construction in metropolitan Bakersfield since the mid-1970s. The lack of east-west inter-regional connections—two state freeways, SR 58 and SR 178 terminate in Bakersfield—is creating increasingly unacceptable congestion and delays in the metropolitan area.

In recent years, the number of vehicles traveling on the highways in Kern County has dramatically increased in proportion to growth in the local population and employment opportunities, as well as in consequence of the large expansion of inter-regional traffic between northern and southern California. One key measure used to define travel demand is vehicle miles traveled (VMT). In 1998, the total daily VMT (DVMT) for Kern County was estimated by Caltrans to be about 18,073,000. Over the 10-year period ending in 2008, total DVMT increased by approximately 23 percent, to some 22,217,000 (Table 6). Looking to the future, the expected urban VMT is projected to expand by almost 88% between 2008 and 2035, to more than 41.7 million miles of vehicle travel per day. By 2035, and despite significant projected improvements in primary highways in the Bakersfield metropolitan area and other key locations across the county, 15 to 17 percent of the vehicle miles traveled at peak hours will still occur over congested facilities, with commensurate additions to travel delay. Such delay, for both resident and inter-regional traffic, means increased fuel consumption and decreased air quality—a significant part of the latter as a result of carbon monoxide and particulate pollutants released by slowed or stalled vehicles.

#### Ongoing Issues in Highway Maintenance and Development

Capital improvement projects for highway projects are included in the Kern COG’s Federal Transportation Improvement Program (FTIP) and Regional Transportation Plan (RTP) and in the State Transportation Improvement Program (STIP). There is some relief on the way with an influx of highway and freeway funding from the 2005 Transportation Act (SAFETEA\_LU) through the Thomas Roads Improvement Program (TRIP) and through the State Transportation Improvement Program (STIP). Over \$1.25 billion in federal, state and local funds is programmed for highway and freeway projects in metropolitan Bakersfield. STIP funding in the amount of \$133 million has been secured for construction of the Westside Parkway from Allen Road to Mohawk Street. These projects, when completed, will help to reduce congestion, improve inter-regional connectivity, and increase safety. Collectively, they should amount to nearly \$210 million in user savings annually based on Year 2030 traffic volumes. Some additional highway improvements are expected from the impending federal Stimulus program, but the extent and effectiveness of that program are as yet uncertain.

#### Inadequate State and Federal Construction Funding

Unfortunately, despite the recent very welcome influx of state and federal funding for projects in the Bakersfield metropolitan



area, there still remains a need for about \$1.5 billion in additional unfunded projects in that area, including the SR 58 extension from Westside Parkway to I-5, the Cross-town Freeway from Westside Parkway to SR 204/178, the Hageman Flyover and the South Beltway from I-5 to SR 58. Further, there is an urgent requirement across the county for some \$500 million in unfunded improvements on SR 99, SR 58, SR 178, SR 46, SR 14, SR 119 and US 295. Proposition 1B, passed by California's voters in 2006, included a billion dollars for improvements on the 400-mile SR 99 corridor; however none of that funding has been committed to any portion of the corridor located in Kern County.

#### Inadequate Local Support for Highway Development

Both the City of Bakersfield and the County of Kern have committed traffic impact fees to allow bonding for roadway improvements and to provide local matching for state and federal funds for major highway projects. Among the County projects that may be funded in full or in part with traffic impact fees are a railroad grade separation at Hageman Road and Santa Fe Way, and the Centennial Corridor on the TRIP program. The City expects to use traffic impact fees to meet matching requirements for federal dollars on the TRIP program. However, the income from such fees is source-limited, and the funds diverted to meet matching requirements are then lost for other high-priority uses.

Much of the necessary local highway improvements could be completed with funding from a self-imposed transportation sales tax in Kern County, as has been emphasized in the Roads section of this report. The arguments made there in favor of Kern's becoming a "self-help" county are at least as applicable—perhaps even more so—in regard to highway infrastructure improvements. Almost all of the densely-populated counties in California, those embracing a large majority of the state's voters, have attained self-help status; thus Kern occupies a minority political position at a point in time when transportation funding legislation tends to favor the majority. In fact, Kern and Kings are the only two counties in Caltrans' District 6 that have not adopted self-help tax measures.

#### Inadequate Funding for Maintenance

A key element in SHOPP development is pavement condition. Using extensive field survey data, Caltrans keeps a detailed inventory database for the almost 15,000 centerline miles and over 49,000 lane miles of highways within its jurisdiction. This database is employed to generate a statewide Pavement Condition Report (PCR) prioritizing pavement distress, identifying project needs, and summarizing the condition of the highway system. Pavement distress is categorized by five condition levels, from "No Distress" to "Major Structural Distress," and the levels are then used to determine the appropriate level of required maintenance (e.g., "Major Structural Distress" suggest that the pavement is a candidate for significant rehabilitation/reconstruction). Caltrans' report for 2007 indicated that about 13,000 lane miles, or some 26%, of the entire state highway system should be listed as "distressed," which is a deterioration level above conditions treatable with simple corrective or preventive maintenance procedures.

In the 2007 PCR, about 25% of the roughly 5,755 lane miles in District 6 were generally categorized as distressed. Further, the proportion of that distress listed as being in the Major Structural Distress category was relatively high as contrasted with conditions in Caltrans' eleven other districts statewide.

Caltrans has set a pavement performance goal in its SHOPP planning to reduce the total distressed lane miles throughout the state from the existing 13,000 to 5,500 by FY 2015/16. However, Caltrans spent some \$1.2 billion dollars over the two-year period FY 2005/06 and FY 2006/07 in performing major overhauls on over 3,100 lane miles of severely distressed pavement, but the net gain as measured by the difference between the 2005 and 2007 PCR data was only 415 lane miles. It appears that the state's pavement was deteriorating at that point much faster than it was being funded for repair, and California's financial circumstances have since only worsened.

Pavement condition is, of course, not the only element that must be considered in planning and budgeting for highway maintenance programs; but it is a critical concern and can serve as a telling example of California's present inability to mount an overall program that is capable of rectifying the continuing degradation of its highway system.

A discussion of the roadway maintenance funding issues confronting local governments in Kern County has already been provided in the Roads section of this report. That discussion is equally pertinent to any thoroughfares constructed by those governments that might be classified as "highways" but remain within their sphere of responsibility for maintenance.

## **Conclusions**

Numerous highway improvement projects are planned for Kern County in the relatively short term—not only in the Bakersfield metropolitan area, but also at other key sites across the county. However, many more are needed and are as yet unfunded. Results forecast to 2035 suggest that traffic congestion will continue to be an issue in the county. Further, the ability of the state and local governments to mount a timely and effective maintenance program remains highly doubtful, particularly in the face of California's ongoing fiscal crisis and the nation's general recessionary economic climate.

## **Selected Information Sources**

1. Thomas Roads Improvement Program (TRIP), *2008/2009 Progress Report*.
2. State of California, Department of Transportation, *2008 California Public Roads Data*, December 2009.
3. State of California, Department of Transportation, *2007 State of the Pavement*, August 2008 rev.
4. Office of the California State Controller, *Streets and Roads Annual Report for 2006/07*, September 2008.
5. Kern Council of Governments (Kern COG) website, <http://www.kerncog.org/cms/transportation>, Transportation subsection.

## **TRANSIT [C-]**

### **The Transit Infrastructure Serving Kern County**

Several demographic characteristics of Kern County that impact heavily on its progress in developing transit services have been mentioned in other contexts earlier in this report. Among them are the county's huge size (nearly 8,200 square miles) and light population density, its complex geography, a recognized tendency to extensive urban sprawl in its few population centers, and the general *idée fixe* of its citizens on the automobile as the preferred transportation mode. These characteristics are not unique to Kern County, as they are shared to some degree by most other counties in California's enormous Central Valley. Nevertheless, such shared demographics do not diminish the pressure on forward-thinking Kern transportation planners as they seek to encourage the development of integrated multi-modal systems for future service to the county's rapidly-growing population.

## **Existing Transit Services**

The two significant transit systems extant in Kern County are Golden Empire Transit, serving metropolitan Bakersfield, and Kern Regional Transit, operated by the County of Kern as an outreach to rural areas. They are complemented to a very limited degree by localized services operating in some smaller Kern County communities, but there is no over-arching authority assuring integration or continuity.

### **Golden Empire Transit**

The Golden Empire Transit District was formed in 1973 to serve the Bakersfield metropolitan area, which now covers about 160 square miles and includes a population well in excess of 400,000. GET's ridership in FY 2007/08 was some 7 million passenger trips via its 19 routes and its GET-A-Lift paratransit service. Recent District survey data indicate that 56 percent of the system's riders have no other form of transportation and depend almost entirely on transit service for local travel.

GET's primary goal is obviously to provide safe, convenient and dependable public transportation for community members needing access to work, school, health services and a multitude of other personal commitments. However, another important goal is to contribute to the greening movement through the reduction of energy consumption and polluting emissions.

The Transit District operates some 80 heavy-duty transit buses in fixed-route mode, plus 19 GET-A-Lift vans. All units are fueled by clean-burning compressed natural gas (CNG), and all are equipped with wheelchair lifts and bicycle racks. The fleet is in operation 7 days a week, traveling nearly 4 million miles a year.

Funding for Golden Empire Transit District comes from several sources. The 2007/08 income stream included: state Transportation Development Act allocations (1/4 of one cent of the state retail sales tax, \$10.5 million); farebox revenues (\$4.5 million); Federal Transportation Administration grants (\$3.6 million); and miscellaneous other revenues (\$0.5 million). The

proposed GET operating budget for FY 2007/08 was \$20.8 million.

Despite the best efforts of its more than 270 employees, GET ridership is obviously a victim of Bakersfield's excessive urban sprawl and the local population's intense commitment to the automobile. Although ridership has been increasing, farebox revenues are still less than 25 percent of the operating budget.

### Kern Regional Transit

Currently a division of the Kern County Roads Department, Kern Regional Transit has been providing services in the unincorporated areas of the county outside metropolitan Bakersfield since 1980. In its first year of operation, KRT ridership was only about 37,000, but that number has multiplied over the years to a very significant 450,000 in FY 2006/07—and the gains have been particularly noticeable in the recent past.

Kern Regional Transit's responses to count transportation needs include:

- Local and inter-city fixed-route services are offered throughout Kern County, with connections to various other local systems and with Amtrak, Greyhound, Airport Bus, Metrolink and Inyo-Mono County Transit;
- Commuter transport is provided between Taft and Bakersfield, (Westside Express) among Delano, McFarland, Wasco, Shafter and Bakersfield (North Kern Express), and between Bakersfield and Lancaster's Metrolink connection—the latter with stops in Tehachapi, Mojave and Rosamond; and
- Local curb-to-curb demand/response ("dial-a-ride") transport is offered to both unincorporated communities and to outlying areas around smaller incorporated cities.

The KRT vehicle fleet includes more than 50 units, ranging in size from 15-passenger minibuses to 32-foot heavy-duty transit buses. Nearly a third of those units are fueled by CNG, and future upgrades and additions will continue that commitment. In 2007/08, KRT's fleet operated about 72,000 hours and traveled some 1.7 million miles.

Funding for Kern Regional Transit comes from essentially the same sources as those available to GET. The proposed KRT operating budget for FY 2007/08 was \$7.0 million, but farebox revenues for FY 2006/07 were \$575,000.

While Kern Regional Transit appears to be doing a good job within available resources, the demand for additional services across the county is significant and growing rapidly. Nevertheless, in the current U.S. recessionary economy, even KRT's modest short-term goal of providing robust commuter service from most local communities to Bakersfield for reaching jobs and schools may be difficult to achieve.

### Local Community Transit Services

GET services to the large Bakersfield metropolitan area and KRT's outreach programs across the county are complemented to some extent at the local level by smaller Kern County communities when they can develop the necessary resources. In the metropolitan Bakersfield area, the North Bakersfield Recreation and Park District also provides services for seniors and persons with disabilities through its designation as the Consolidated Transportation Services Agency.

The most common transit format offered in smaller communities is local dial-a-ride, although some also provide limited fixed-route scheduling. Delano Area Rapid Transit (DART) is exemplary of the more developed programs of the latter sort. DART features two types of service during daylight hours: dial-a-ride, operating within Delano and areas of Kern County immediately adjacent to the city; and fixed-route, operating on three routes within the city limits. No service is available in the evening, on Sunday, or on most holidays.

A few small public transit authorities operating in Kern County provide support to more than one community. The Antelope Valley Transit Authority offers fixed-route, commuter and dial-a-ride services to the communities in the Antelope Valley, with strong connections to the Los Angeles area. Although primarily based in Inyo and Mono counties, the Eastern Sierra Transit Authority's interregional CREST route extends from Reno (Nevada) to Ridgecrest.

### Conclusions

Despite significant efforts by Golden Empire Transit, by Kern Regional Transit and by other localized community transit services, the large majority of Kern County residents do not appear to view public transportation as a viable option. However,

some recent polling results do seem to indicate that at least a modest attitudinal shift towards transit as an acceptable transportation option may be occurring in Kern County. Due to economic and social pressures prevailing in the region, a small but increasing proportion of the county's population report that they are motivated to consider transit because: they don't have access to other forms of transportation, especially to get to work; they need to reduce transportation costs; or they desire to have a lower impact on the environment. However, just how and when such changes in attitude may make a substantial impact on the acceptance of true multi-modal transportation services across Kern County remain to be seen.

### **Selected Information Sources**

1. Kern Council of Governments and Kern Transportation Foundation, *Roads to Ruin*, January 2002.
2. Kern Council of Governments website, <http://www.kerncog.org/>, Transportation sub-section.
3. Golden Empire Transit District website, <http://www.getbus.org/>, Report to the Community sub-section
4. County of Kern website, <http://www.co.kern.ca.us/>, Roads: Kern Regional Transit sub-section.
5. North Bakersfield Recreation and Park District website, <http://www.norrecreation.org/>, Senior Services sub-section.
6. City of Delano website, <http://www.cityofdelano.org/index.aspx>, Transportation Services Department.
7. Antelope Valley Transit Authority website, <http://www.avta.com/>.
8. Eastern Sierra Transit Authority website, <http://easternsierratransitauthority.com/wb/>.

## **BRIDGES [C+]**

### **Kern County's Bridges**

#### **A Basis for National Concern**

For a considerable number of years, ASCE—through its Report Card initiative and other public awareness efforts—has attempted to alert this country to the failing condition of its national infrastructure. If measured in terms of action plans implemented by concerned governmental leaders in response to ASCE's message, the results of these attempts were generally disappointing until a catastrophic event in 2007 achieved international media coverage: on August 1 of that year, the I-35W Mississippi River bridge in Minneapolis, Minnesota, experienced catastrophic failure during the evening rush hour. It collapsed into the river and onto the riverbanks beneath, killing thirteen people and injuring 145. Escalating public concern across the U.S. caused governmental entities at all levels to hastily review the condition of bridge structures within their respective purviews. The published results were more than disturbing, confirming ASCE's repeated warnings and leading to major media coverage of the decaying condition of other elements of the country's public infrastructure.

Preliminary results from ASCE's 2009 *Report Card for America's Infrastructure* indicated that 26%, or about one in four, of the nation's bridges were either structurally deficient or functionally obsolete; the grade awarded in the Bridges category was a "C." It was estimated at that time that a \$17 billion annual investment would be needed nationally to substantially improve current bridge conditions, with only some \$10.5 billion actually being spent.

#### **The National Bridge Inspection Model**

The Minneapolis I-35W structure was an eight-lane, steel truss arch bridge. In 1967, when the bridge opened, it had two traffic lanes and a third acceleration/deceleration lane in each direction. By 1988, a third traffic lane had been added in each direction. The results of an investigation subsequent to the collapse pointed to a design flaw rather than an inspection issue. Four years before the bridge collapsed, inspections had shown that a structural element had already exhibited edge buckling failure, but apparently little had been done to respond to that condition.

Implementation of the 1968 Federal-Aid Highway Act led to the development of the National Bridge Inspection Standards (NBIS). The NBIS were originally promulgated by the Department of Transportation to assess existing bridge conditions, but the program has since been amended to include such provisions as: requiring inspections of bridges longer than 20 feet on

all public roads; establishing minimum training and experience requirements for bridge inspectors; and setting maximum inspection intervals for the bridges subject to the program. In part, these standards require general bridge condition to be assessed according to a scale ranging from 0 (failed condition) to 9 (excellent). The ratings are an overall assessment of the physical condition of the deck, the superstructure, the various substructure components, or the culvert.

The classification “structurally deficient” in NBIS terminology is used to determine eligibility for federal rehabilitation and replacement funding. Bridges are so classified if they have a general condition rating for the deck, superstructure, substructure or culvert (large box culverts may be classified as “bridges”) of 4 or less, or if the road approaches regularly overtop due to flooding. For bridge owners, the structurally deficient classification does not necessarily imply that the facility is unsafe; rather, it is a reminder that the structure needs further analysis that may lead to load posting, maintenance, rehabilitation or closure.

Another term used to establish the priority status of a bridge with respect to federal rehabilitation and replacement funding is “functionally obsolete.” This designation is unrelated to structural adequacy, and may be applied where the structure was built to geometric standards less than the federal minimum requirements for a new bridge. A bridge may be designated as functionally obsolete if the number of lanes on the bridge doesn’t meet current standards or if the lanes are too narrow, if the vertical clearance above the bridge is restrictive, or if the roadway alignment is poor. Such facilities are not automatically rated as structurally deficient, nor are they necessarily inherently unsafe.

Yet another categorization that is important in the competition for federal funds to improve or replace publicly-owned bridges is “sufficiency rating,” a computed value ranging from 0 to 100 employed in establishing eligibility for such funding. The formula used in the computation takes into consideration structural condition, bridge geometry and traffic considerations. A sufficiency rating of 80 or less entitles a structure to be considered for federal rehabilitation support, while a rating of 50 or less makes it a candidate for replacement funding.

The 1968 Federal-Aid Highway Act directed the states to maintain an inventory of federal-aid highway system bridges. This mandate ultimately resulted in the development of the Federal Highway Administration’s National Bridge Inventory (NBI), an electronic database of almost 600,000 bridges located on public thoroughfares, including Interstate Highways, U.S. Highways, and state and local roads and highways. The database is a compilation of information supplied by the states according to NBIS procedures and formats. The NBI provides a vehicle for state-by-state analysis of the number, location and general condition of roadway bridges across the country.

To place the Minneapolis I-35W bridge failure in context, it should be noted that application of the NBIS assessment process to that facility resulted in a structurally deficient rating in 1990, with significant corrosion in its bearings cited. In 2005, the bridge was again rated as structurally deficient and in possible need of replacement, according to the NBI database. Approximately 75,000 U.S. bridges had such a classification in 2007. On August 2, 2007, the day after the failure, Governor Pawlenty stated that the bridge was scheduled to be replaced in 2020.

### **Bridge Issues Affecting Kern County**

In California, bridge inspections are conducted by highly trained and experienced Caltrans civil engineers and non-destructive testing technicians. This work is the responsibility of the Structure Maintenance and Investigations (SMI) section of the Caltrans Division of Maintenance. SMI performs inspections in accordance with federal regulations on over 12,000 state highway bridges and approximately 12,200 structures in the holding of local government agencies. This includes making structure repair recommendations, determining the safe load capacity of all bridges, reviewing and approving encroachment permits and air space lease proposals involving structures, delivering plans, specifications and estimates for maintenance projects, and coordinating the protective coating work on over 800 steel bridges in the state highway system. Immediately after the Minneapolis I-35W bridge failure, Caltrans inspected all steel-deck truss bridges in California, and all such structures were found to be safe.

### **Status of Bridges in Kern County**

The most recent version of the National Bridge Inventory indicates that California has records for 24,463 structures, of which



there are 3,228 rated as structurally deficient and 3,888 rated as functionally obsolete (a total of 29.1%). Kern County is listed as containing 610 bridges, with 56 of them structurally deficient and 61 functionally obsolete (a total of 19.2%). Current Caltrans records from the SMI section of the Division of Maintenance indicate that 276 of Kern's total bridges are in the purview of local agencies, with 25 rated as structurally deficient and 21 as functionally obsolete (a total of 16.7%). Therefore, the overall statistics for California suggest a general condition statewide somewhat worse than the 26% deficient figure quoted by ASCE for the U.S.; but the Kern County bridge infrastructure appears substantially better off than either the national or the state averages. However, a serious concern underlies even this apparently gratifying conclusion: the NBI data actually reveal that nearly one in every five of the county's bridges is considered to have significant service issues.

The Caltrans *2009 Five-Year Maintenance Plan* states that the number of state-supported highway bridges with backlogged major maintenance needs at the beginning of FY 2008/09 was 2,713, with a pending investment of \$155.1 million expected to drop that number to 2,541 by the end of the fiscal year. The Plan projects that a continuing maintenance program at the same funding level would achieve the Caltrans goal of reducing the backlog to approximately 10 percent of the inventory (about 1260 bridges) in some eight years. Considering California's ongoing financial crisis, achievement of even that rather unsatisfactory goal may be a matter open to question. The proportion of any such future maintenance funding that might be applied to state-supported bridges in Kern County is unknown, but seems likely to be insufficient. Caltrans does maintain a priority list of state highway bridges that are at once structurally deficient or functionally obsolete and also have a sufficiency rating of 50 or less, and eight Kern County bridges are included in the 2007 version of that list—but the list contains almost 230 structures.

An important source of maintenance and improvement funding for public bridges in California is the federal Highway Bridge Program (HBP) authorized under the Transportation Equity Act for the 21<sup>st</sup> Century (TEA21). California's annual HBP apportionment is managed by Caltrans through its Division of Local Assistance and is split 45 percent for state highway bridges and 55 percent for locally-owned structures, to address various federally-identified deficiencies. The local share state-wide amounts to about \$160 million each year, and program funding covers 88.53 percent of eligible project costs. The latter may include preliminary engineering, right-of-way acquisition and construction. However, the federal allowance does not go very far in addressing the needs of a state the size of California: Kern COG's current FTIP includes a total of only \$1.1 million for various small HBP projects across the county.

Unfortunately, local governments remain responsible for providing the 11.47 percent HBP matching funds and for the entire cost of their non-HBP project costs. Kern County's local government budgetary issues have already been discussed in the Roads and Highways sections of this report, and need not be repeated here—inasmuch as bridges are just another element in the same underfunded transportation network.

## **Conclusions**

California's public bridges, including those in Kern County, are routinely inspected and evaluated according to federal standards; and the results are tabulated in the federal National Bridge Inventory database. Data for the state's overall inventory of state highway and local agency bridge structures indicates that the number of those structures rated as "structurally deficient" or "functionally obsolete" somewhat exceeds the national average, but the data for Kern County alone are well below that average. Even so, nearly one in every five of the county's bridges is considered to have significant service issues according to the federal standards. As with other elements of the county's transportation system, currently available federal, state and local funding appears insufficient to address those issues in a timely manner.

## **Selected Information Sources**

1. California Department of Transportation website: <http://www.dot.ca.gov/>.
2. Kern Council of Governments (Kern COG) website, transportation section: <http://www.kerncog.org/cms/>.
3. U.S. Department of Transportation, Federal Highway Administration, *Tables of Frequently Requested NBI Information*, August 2009.
4. Caltrans Division of Local Assistance, *Local Assistance Program Guidelines*, December 2001.
5. Caltrans Division of Maintenance, Structure Maintenance and Investigations, *Local Agency Bridge List*, June 2009.

## RAIL [C+]

### Rail Service Infrastructure in Kern County

Kern County is generally regarded as a key crossroads location for traffic and goods movement within California. Not only do several major state and inter-state highway routes criss-cross the county, but also the BNSF Railway Company (BNSF) and Union Pacific Railroad (UPRR) “heavy rail” mainline trackage through Kern links northern and southern California and provides a primary cross-country freight route to the east. Amtrak ridership and commercial rail freight loadings in the county have been growing, reflecting recent heavy increases in operating costs for other transportation modes; but facilities limitations have definitely restricted progress.

While trains are emerging as an apparent solution to many issues in the mass movement of people and goods in the U.S., various related health and safety concerns of particular interest to Kern County residents are also beginning to focus. For example, soot and nitrogen oxide (NOx) emissions from diesel-powered trains now must be cut drastically by 2030 pursuant to EPA regulations issued in March 2008. Those regulations begin to take affect for trains in 2015 and require reductions in fine particulate soot emissions by 90% and in NOx by 80% prior to the 2030 deadline. To satisfy the new EPA rules, locomotives will need to use cleaner fuel, be retrofitted for higher performance, and ultimately be replaced with equipment having newer, cleaner engines.

#### Passenger Rail

Since 1976 California has been among the few states which complement the basic Amtrak system by investing in additional resources (Amtrak California). Through Caltrans’ Division of Rail (DOR), this state now provides capital grants for station and track improvements (including signaling), rolling equipment stock, connecting Amtrak bus services, and operating assistance for three north-south corridors. The 363-mile San Joaquin Corridor includes Kern County.

#### Amtrak

In 1971, rail passenger service between Kern County and Los Angeles across the unique “Tehachapi Loop” was abandoned, and that route segment was dedicated exclusively to the more lucrative rail freight traffic. However, the Amtrak San Joaquin Corridor was inaugurated in 1974, now providing four daily round trips from Bakersfield to Oakland and two to Sacramento; but connectivity from Bakersfield to various points in Southern California is provided by Amtrak bus services. Caltrans statistics indicate that the San Joaquin Corridor ridership exceeded 800,000 in FY 2005/06, producing more than \$26 million in income.

Local Amtrak serviceability is heavily impacted by infrastructure conditions along the entire corridor. San Joaquin trains operate in Kern County over BNSF Railway Bakersfield Subdivision tracks. Further north, the trains employ a combination of either BNSF or Union Pacific trackage to reach their destination points in Oakland and Sacramento. There are 13 intermediate stops between Bakersfield and Oakland, plus another in the branch between Stockton and Sacramento. While roadbed condition is satisfactory, a large proportion of the corridor is in single-track configuration, and more than 400 public and private at-grade crossings exist along the right-of-way.

Caltrans statistical sources indicate that the average run time between Bakersfield and Oakland is 6 hours and 13 minutes, yielding an overall average speed of 50 MPH, and the Sacramento run is at similarly limited speeds. Maximum speed along the corridor is 79 MPH. On-time performance for the past year was 83.8%, with the chief cause for delays being interference from other trains. Almost 60% of trips on the corridor either pass through or terminate in Kern County, and approximately 75% of San Joaquin Corridor trips are leisure excursions. Rail travel along the corridor—while helping to relieve highway congestion and exhaust emissions—apparently does little to enhance the state’s commerce and economic growth.

The future of passenger rail in California is not entirely clear at this time, as California is beginning implementation of a landmark statewide initiative that would ultimately link metropolitan areas from San Diego to San Francisco and Sacramento

through the San Joaquin Valley with a completely new high-speed rail system similar to those now extant in Japan and much of continental Europe, capable of top speeds of 220 MPH. The role of Amtrak in the state subsequent to completion of that initiative has not been determined. Should Amtrak and Amtrak California continue to serve this state in the same context as now exists, it is clear that environmental concerns will have an increasing impact on equipment and operations. The new EPA March 2008 emissions regulations are merely one example. Costs for compliance are difficult to forecast at this early point in time, but they will be appreciable. The source(s) of funding are undefined, but federal assistance is likely to be sought.

More immediate practical concerns about Amtrak in Kern County and the San Joaquin Corridor relate to physical safety; these include such matters as emergency locomotive stopping systems, roadbed and track configuration and condition, at-grade crossing safety, and station security. In 2008, DOR outlined a comprehensive long-range program of improvement projects based on incremental cost/benefit analyses of various alternatives. In the San Joaquin Valley, the ultimate goal would be a double-tracked corridor, complete with improvements to stations, sidings, crossings and curves where deemed essential. The program focus was on projects oriented to passenger service needs, but many of those projects would also benefit freight traffic. A business plan prepared at about the same time, factoring in possible funds availability, indicated that some 37 projects state-wide appeared to be slated for support in the near future. Among the 37 were only two which might have direct benefits to Kern County travelers through equipment and trackage improvements. DOR's long-range program document did summarize all possibly available local, regional, state and federal funding sources, but the viability of many may be questionable in view of prevailing economic conditions.

### High Speed Trains

In November 2008, California voters approved a statewide ballot measure containing \$9 billion for bond financing to begin the implementation of the high-speed new train system. The state funding will represent California's contribution to a tripartite financial plan requiring additional federal and private sector resources. The cost to build the entire 800-mile system is estimated at about \$40 billion.

The California High Speed Rail Authority (HSRA) was established in 1996 as the state entity responsible for planning, constructing and operating the state's projected high-speed train system. The Authority has since been proceeding through the complex steps required to complete the numerous engineering, environmental and financial preliminary plans and assessments necessary to validate the concept. The system will operate over its own specially designed and constructed trackage, with no at-grade crossings and only about 26 station stops. However, whenever possible, it is intended that the system share right-of-way with existing railways, both to save cost and to avoid undue environmental disturbance; the existing facilities would obviously gain considerable benefits from the relationship, as well (e.g., grade separations). In the Central Valley, the route would generally parallel Highway 99, and probably share right-of-way with BNSF. A trip from Los Angeles to San Francisco is expected to take about 2 hours and 40 minutes.

California's projected high-speed rail system should prove a safety model for other similar rail facilities across the country. It will run on entirely new, specially-designed trackage exclusively devoted to the new system, it will encounter no at-grade crossings, and it will be equipped with fail-safe automated safety equipment. The power source would be non-polluting electricity, and its designers are tasked with minimizing the carbon footprint involved in its generation.

### Rail Freight

The Association of American Railroads (AAR) collects and synthesizes statistical data reflecting industry operations. California generally ranks among the top 20% of states in almost all categories, and rail commerce is clearly an important factor in the economy of this state. For example, in 2006 a total of some 33,121,261 rail carloads were terminated in the 50 states and the District of Columbia; of those terminations, California ranked first with 3,892,906, or 11.7%.

Kern County's BNSF and UPRR main line rail infrastructure is a significant element in California's goods movement resources, but the single-track BNSF Bakersfield Subdivision must support both Amtrak and BNSF rail freight in the southern portion of the San Joaquin Valley. Unlike Amtrak, freight trains continue to use the UPRR and BNSF trackage through Mojave to connect to other main lines running north, south and east across the high desert portion of the county and serving as the principal tie to Southern California and the southeastern portion of the U.S. The route is referred to as the "Tehachapi Trade

Pacific Rim commerce. Unfortunately, the single-track configuration (BNSF and UPRR share the track), excessive at-grade crossings, steep grades, inadequate tunnels and outdated signaling along the Tehachapi Segment have earned it an “E” (At Capacity) AAR rating—placing it in the next-to-lowest Level of Service category.

It is difficult to separate the public service and private enterprise aspects of rail infrastructure. Improvements supported by Caltrans primarily for facilitating Amtrak California programs are also beneficial to the rail freight operations of the railroads owning the trackage and right-of-way. Unfortunately, railroads seem slow to reveal financial details of their operations; so assessing the private portion of the “public/private partnership” is often difficult.

However, California’s Proposition 1B, November 2006, provided for \$2 billion to be transferred to the Trade Corridors Improvement Fund (TCIF), available for allocation by the California Transportation Commission (CTC) to projects along transportation corridors having a high volume of freight movement. Kern County was approved for two projects: the Shafter Intermodal Rail Facility (\$15 million), and the Tehachapi Trade Corridor Rail Improvement Project (\$54 million). The latter consists of the double tracking of 6.9 miles of main line infrastructure, extension of a critical siding, the upgrading of the signal system to centralized control, and (potentially) improvements to several tunnels—all along the AAR E-rated Tehachapi Segment. The details of either adopted project are limited at this time, but significant matching funds will be required from the non-state participants.

Rail freight entrepreneurs will also be required to conform to the new EPA emissions regulations and other pertinent environmental rulings—and they also may well turn to the federal government for help.

Any trackage and grade separation improvements made in Kern County and elsewhere along the San Joaquin Corridor to improve passenger rail service safety obviously will also benefit rail freight providers. Similar improvements occurring north of Bakersfield through rail freight funding channels will, in turn, generally be beneficial to passenger rail. It is improbable that Amtrak will ever be able to re-institute service across the Tehachapi Segment; thus the anticipated TCIF project there would not have any reciprocal positive outcomes for passenger traffic.

Rapid increases in trackage congestion and in demands from shippers for precise information about the location of their goods have motivated railroads to seek cost-effective control solutions from new technology. BNSF is pioneering the use of the new Electronic Train Management System (ETMS), a GPS application that should allow the railroad to constantly monitor the exact location and speed of all its trains and includes provisions for automated stopping.

## **Conclusions**

After extensive review of available information sources, the overall local ASCE Report Card grade for rail infrastructure directly impacting upon the movement of people and goods in Kern County has been determined to be “C+.” This assessment is primarily based on the significant existing infrastructure limitations currently affecting both passenger and freight rail operations in the county. However, some upward adjustment in the allotted grade has been made to reflect various improvements already approved and impending in the immediate future.

## **Selected Information Sources**

1. Amtrak California website, <http://www.amtrakcalifornia.com/>.
2. Caltrans Division of Rail website, <http://www.dot.ca.gov/rail/dor/>.
3. California High Speed Rail Authority website, <http://www.cahighspeedrail.ca.gov/>.
4. Association of American Railroads, *State Rankings 2006*, (statistical tabulations).
5. Caltrans, *(Draft) San Joaquin Corridor Strategic Plan*, Parsons Brinckerhoff, January 2008.
6. Association of American Railroads, *National Rail Freight Infrastructure Capacity and Investment Study*, September 2007, Cambridge Systematics, Inc, Sept. 2007.
7. California Transportation Commission, *Adoption of Projects for the Trade Corridors Improvement Fund (TCIF)*, April 10, 2008, Resolution TCIF-P-0708-1.

## FLOOD CONTROL [D+]

### The Flood Control Infrastructure Protecting Kern County

Recent flood events across the nation have heightened concerns about flooding potential. The goal of this section of the local ASCE Report Card process was to assess the status of current flood control facilities/systems in Kern County and evaluate their abilities to provide flood protection.

Kern County covers an area of over 8,000 square miles consisting of the southern end of California's Central Valley, mountainous regions to the west, south and east of the Valley, and desert terrain farther to the east. The county typically receives less than six inches of precipitation per year. While some areas of the county have a history of flooding, most of the region was formerly of a rural nature, and flood control was not generally considered a high-priority issue. As a result, few local flood control facilities were constructed prior to the completion of Lake Isabella Dam in 1953. The one exception was the Kern River Levee System through Bakersfield that is currently maintained by the City of Bakersfield.

During the 1950's and 60's, an increased concern for flood issues resulted in the county's creating a dedicated unit to deal with drainage and flood issues. During that same period, the Kern County Water Agency (KCWA) was created concurrent with the building of the California Water Project; KCWA also has the ability to participate in flood control activities. Even though the County of Kern, KCWA and the federal government worked to address flood issues during the 1960-2000 time period, relatively few facilities were actually constructed. In areas subject to periodic flooding, various projects have been identified over the years but have not been implemented, principally due to a lack of funding. In many cases the lower population density in rural or small communities resulted in a low cost/benefit ratio for such projects, as well as high individual cost for impacted land owners. In consequence, the projects were commonly rejected. Thus, with the exception of Lake Isabella Dam, the Kern River-California Aqueduct Intertie and some smaller projects in other areas, few flood control facilities are extant in Kern County. At the present time, floodplain management issues are handled by the Engineering section of the county's Engineering & Survey Services Department.

#### Emerging Issues in Flood Control

Several issues involving flood control in Kern County are becoming increasingly significant, including:

##### Maintenance Funding

With the exception of Lake Isabella Dam, which is in the domain of the U.S. Corps of Engineers, maintenance of local public flood control infrastructure is nominally a responsibility of the County of Kern. Over the past few years, the county effort has, in general, been limited to the implementation of the National Flood Insurance Program (NFIP), and KCWA has withdrawn from flood control activities not directly related to its primary mission of water supply. Ongoing funding for maintenance of the few existing facilities is essentially limited to that available through the County of Kern's annual budget process and varies significantly from one year to the next, inasmuch as such funding must compete with all other budgetary needs.

##### Metropolitan Area Encroachment

Kern County has historically experienced few significant flood issues in populated areas, although a few notable exceptions have occurred, such as localized flooding in the Lamont area, in some portions of Rosamond, and in Frazier Park. However, Kern County's recent rapid population growth and related development activities have now resulted in considerable encroachment into areas previously identified as subject to inundation.

##### Isabella Dam

Lake Isabella Dam has been ranked by the U.S. Corps of Engineers as perhaps having the highest risk for failure of all the dams within the Corps' sphere of responsibility. It is not only subject to seepage at a rate that has caused a major restriction in its capacity, but also has been found to straddle an active fault line. Liquifaction, an inadequate spillway and poor construction of the Boral canal conduit are also serious problems. The Corps is now engaged in a years-long assessment of



the dam, intending to develop an appropriate repair plan. While the project has a high national priority and the Corp of Engineers has full multi-year funding of several million dollars per year to determine a recommended course of action, implementation of the actual construction program seems far in the future and will likely result in a project that will have a significant cost. A closely associated issue is the status of the Kern River Levee system through the urban Bakersfield area. A current review of that levee system is under way and will be completed within two years.

### **Conclusions**

The current inadequate status of flood control in Kern County has resulted in the assignment of an overall grade of “D+” to that element of the local public service infrastructure. This determination is based primarily on the absence of any dedicated and consistent funding sources for: 1. assessment of flood hazards; 2. maintenance and improvement of existing facilities; and 3. construction of new flood control infrastructure as needed. These deficiencies are increasingly critical in an era of expanding development in the county, and they should be addressed at the earliest possible time through action by local government in the interest of public safety. The situation is seriously exacerbated by the uncertainty over the status of Lake Isabella Dam; therefore the current efforts to develop an appropriate remediation plan for that facility must be completed as expeditiously as possible.

### **Selected Information Sources**

Kern County Engineering and Survey Services Department website: <http://www.co.kern.ca.us/ess/>.

Kern County Water Agency website: <http://www.kcwa.com/default.shtml>.

City of Bakersfield, Public Works Department website: <http://www.bakersfieldcity.us/cityservices/pubwrks/>.

U.S. Army Corps of Engineers, National Inventory of Dams website:

<http://www.usace.army.mil/Library/Maps/Pages/NationalInventoryofDams.aspx>.

# How You Can Make a Difference

## Why Should You Be Concerned?

The Southern San Joaquin Branch of ASCE and the organizations affiliated with it in creating this *2009 Report Card for Kern County's Infrastructure* obviously had a purpose in mind in devoting many hundreds of hours of volunteer public service to the assessment reported in these pages and to the publication of this document. We do understand that, even though you have a copy in hand, the booklet is lengthy; and you may well not have taken the time to read it in detail. What we do hope is that your reaction to the portions you *have* read is one of deep concern about the quality and serviceability of Kern County's public infrastructure. We want you to understand that problems with that infrastructure do exist, and that what is done—or not done—about those problems will in large part determine the county's economic climate and the quality of life for you and its other citizens for many generations to come. The time for action is now, for after years of deferred or ignored critical local infrastructure needs, further delays will only worsen the situation and increase the bill that ultimately we all must pay.

This booklet emphasizes the fact that public infrastructure is a complex network of public works ranging from roads and highways to school facilities, and from water management installations to energy production technology. Also made obvious is that creating, operating, maintaining and improving such infrastructure involves far more than relatively routine technical tasks: extensive planning, design, financing, construction and upkeep efforts are required, very often in difficult social, political, economic and regulatory environments. To make this multi-dimensional matrix of interrelated tasks and influencing factors all work effectively, however, it is crucial that each citizen understand that he or she has “skin in the game.” Whether the individual's primary interest is shortening the daily commute, attracting new business to the community, generating new tax revenue, or assuring a sound physical environment for children, concern about—and advocacy for—infrastructure quality is essential.

Infrastructure is the foundation upon which the structure of our modern society has been built. If it continues to be neglected or ignored, that society as we know it may be seriously impaired.

## How Should You Approach Involvement?

If, as we hope, your study of this booklet has stimulated your interest in and concern about infrastructure issues in Kern County, you may well be wondering just how you might contribute in some manner to the achievement of productive solutions. Various ASCE bodies involved in pursuing report card programs across the country have suggested a list of actions similar to the following for citizens considering some level of advocacy:

**Be an Informed Citizen** — In order to influence the thinking of others in your community about local infrastructure needs, you must yourself be knowledgeable on the subject being discussed. Therefore, the first step in such advocacy clearly must be self-education. A good starting point might be closer study of this report document, followed by consideration of some of the references cited following the discussion of each infrastructure element assessed. Many other sources of information are available via Internet websites or by contacting responsible public agencies directly. Attending pertinent public meetings, while often tedious, can also be extremely helpful.

**Demand High Priorities for Infrastructure Maintenance** — It is common knowledge among professional engineers that regular maintenance significantly prolongs the life of infrastructure facilities and greatly reduces their life-cycle costs. Further, if transportation, water management, school and other physical resources are not kept in sound condition, they will soon be unable to provide the level of service for which they were designed. For some years, many government decision-makers have tended to give local infrastructure maintenance lower budgetary priorities than other more socially-appealing programs. The results are frequently obvious, and informed taxpayer pressure needs to be applied to reverse such short-sighted practices. However, local government officers are not alone in their responsibility for infrastructure neglect, as the taxpayers themselves have tended to avoid confronting such issues. For example, voters in almost half of California's counties have now taken steps to ensure transportation funding by approving local sales tax measures, while Kern's electorate has twice in recent years defeated such measures. The result is that this county not only lacks locally earmarked funding for the maintenance

and improvement of transportation facilities, but also has no dependable source of matching monies to compete for support from the many state and federal grant programs that require such matching.

**Develop a Long-Term Perspective** — Re-capturing America's lost world leadership in infrastructure development is a critical—albeit somewhat ambitious—goal at this point in our county's history. ASCE estimated in its *2009 Report Card* report that a total capital investment by all levels of government of \$2.2 trillion over the ensuing five years would be required to restore the nation's infrastructure to good condition. While there now seems some national commitment to such restoration, it also seems doubtful that the process can realistically be accomplished in only five years; and it is clear that the overall cost will increase in proportion as the timeframe is extended. That being said, infrastructure advocates must then learn to join patience with perseverance, remembering that comprehensive planning and investments for long-term productivity are really the key to sound decisions about infrastructure.

**Understand All Ramifications of an Infrastructure Decision** — Over the past several decades, engineers and other planning and design professionals have come to realize that proposed infrastructure developments cannot be analyzed merely by simplistic cost/benefit methods based on the estimated construction cost of alternative solutions and the projected dollar savings to the user population; many other social and environmental impacts must now be considered. For example, the concern that a new highway bifurcating a community may isolate and disadvantage segments of the existing population must be balanced against the reduction in congestion costs and air pollution resulting from improved traffic flow. In consequence of such involved considerations, contemporary modeling techniques employed in infrastructure planning are now extremely sophisticated, requiring a much wider range of data inputs than even their immediate predecessors. Citizens interested in infrastructure issues must be prepared to understand and respond to the results produced by these more comprehensive analytical tools.

**Insist That the Efficiency of Infrastructure Investment Be Maximized** — A popular slogan employed by politicians seeking to avoid difficult budgetary realities is "Do more with less." While ASCE members certainly believe in maximum efficiency in the expenditure of public funding for capital investments, the plain fact is that restoring America's infrastructure will require significant increases in spending for that purpose at all governmental levels. At the same time, however, every possible means of achieving economies during that process should be considered. New technologies, new design approaches and new materials are emerging to offer better, more cost-effective, solutions to problems ranging from traffic congestion to water pollution. Americans are also learning to change their behavior: water and energy conservation, recycling, telecommuting, and use of public transit are examples of personal strategies reducing demands on our infrastructure. Thus, by being open to change and to new approaches in our lifestyles, we certainly can achieve the goal of maximizing the value of our infrastructure investment—in Kern County and across the nation.

**Remember to Preserve the Environment** — Although now temporarily slowed by the current recessionary times, Kern's rate of population growth has recently been one of the fastest among California's counties. As plans go forward in the future to accommodate to such growth, it will be more than important to balance environmental and economic goals. Most county residents are protective of the natural environment, and wish to see that it remains available to future generations in as unspoiled a condition as possible. Land use patterns and infrastructure additions—transportation facilities in particular—must be designed not only to foster economic growth and personal mobility, but also to harmonize with environmental benefits. Someone once said, "They just aren't making any more land," and that homily certainly applies to Kern County!

**Relate to the Big Picture** — In advocating for the intelligent restoration of America's infrastructure, whether it be at the local, state or national level, remember that any direct personal benefits you may receive are only a part of broader benefits to some larger community in which you hold membership. For example, although you may or may not expect to use public transit, the option it offers to others will reduce local traffic congestion and may increase property values in some of the areas being served—thus indirectly returning possible benefits to you. Elevating this concept of extended benefits to its highest possible level, the national ASCE organization has recommended to Americans a program entitled *Five Key Solutions*. While the program is primarily directed to our country's leaders and policy-makers, it is intended to be of interest to all citizens. The five *Solutions* elements are:

1. Increase Federal Leadership in Infrastructure

2. Promote Sustainability and Resilience
3. Develop Federal, Regional and State Infrastructure Plans
4. Address Life-Cycle Costs and Ongoing Maintenance
5. Increase and Improve Infrastructure Investment from All Stakeholders

More information on the *Solutions* program can be found on the Internet at:

<http://www.infrastructurereportcard.org/solutions>.

## Methodology

As has been mentioned earlier in this document, the general procedures followed by the Southern San Joaquin Branch's Infrastructure Report Card Committee (IRCC) in conducting the assessment leading to this report were modeled on those employed by the national ASCE organization in developing its *Report Card on America's Infrastructure* series. The national procedures have been further delineated by the California Infrastructure Report Card Committee on behalf of ASCE's Region 9, and the product of those efforts was also helpful in shaping the Kern County assessment. However, the procedures defined by both ASCE reference sources were necessarily tailored by the IRCC to fit the limited human and fiscal resources available to the Branch.

### The Project Objective

The Southern San Joaquin Branch's overall objective in undertaking its Report Card project was essentially the same as that of the many other ASCE bodies across the United States participating in similar initiatives at their respective local, state and national levels: to raise public awareness of the urgent need for attention to the preservation, restoration and improvement of the foundation infrastructure systems critical to modern economic vitality and quality of life. The Branch's particular focus was on Kern County's infrastructure, and its specific intent was to assess that infrastructure's current status and report to local citizens and their leaders and decision-makers on the actions necessary to assure its full serviceability for both the short and long terms.

### The IRCC Organizational Structure

ASCE guidelines typically suggest what amounts to a three-tier committee organizational structure for sections and branches desiring to embark on an infrastructure report card assessment for their membership area. The tiers include: working committees of four to six technical experts to compile and analyze the data for each infrastructure element evaluated, including the preparation of a summary report on the committee findings and grading for that element; an executive review committee charged with reviewing the working committees' reports, validating their methodology and findings, and "normalizing" the final report card product; and a communications committee responsible for planning and organizing the dispersal of information on the initiative's activities and outcomes. Thus, to develop a committee organization in full accord with the ASCE guidelines, perhaps as many as 100 participating technical and professional volunteers might be required.

The Southern San Joaquin Branch's relatively small membership is dispersed over a lightly-populated county of large size. Further, many of the members were not in a position to volunteer for the sort of intensive effort required by the report card process. Nevertheless, some 15 dedicated local professionals did step forward to form the IRCC and commit to the very significant workload involved (see Committee Roster herewith). Inasmuch as the IRCC subsequently adopted a highly ambitious work plan requiring the assessment of 15 infrastructure elements, it is obvious that pursuit of the tasks described in the ASCE guidelines required each member of the IRCC to accept more than one role. For example, the working committees generally included only two or three members, and each member typically served on more than one working committee. Executive review and communication efforts were normally performed by the IRCC functioning as a "committee of the whole," or by ad hoc delegation to specific members. Despite such limitations, the basic assessment process was ultimately completed, and this report has been created.

One unfortunate circumstance emerged as the IRCC committees pursued their assessment activities: in numerous instances, the data available from the agencies responsible for particular elements of the local public infrastructure were not adequate to support useful projections of the five-year costs to restore those elements to good condition. The agencies in question were generally very willing to share any information in their possession, but many have been so heavily impacted by California's ongoing financial crisis and resulting gyratory budget scenarios that their capital planning processes are somewhat in disarray. Another factor is the impending infusion of some unclear amount of federal ARRA funding; the dollars will be welcome, but their real impact is currently uncertain. Taken together, these circumstances created an environment in which it was not feasible for the heavily-tasked IRCC members to develop sound and responsible five-year projections. However, some financial data is included—where available—in the discussions provided for individual infrastructure elements.



## **The Grading Process**

Development of grades for Kern's Report Card involved consideration of four fundamental criteria relating to each infrastructure element evaluated:

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

**Capacity** — Were the current infrastructure facilities able to support the current user population? Would the existing and planned (funded) facilities be able to support that community in ten years? Existence of such formal documents as master plans, funding plans, and capital improvement programs were key components in the capacity assessment.

**Operations and Maintenance** — Since operations and maintenance (O&M) programs can be difficult to evaluate using generalized standards, the working committee for each element was encouraged to develop evaluation parameters specific to that element. Key issues were the level of compliance of the specific system with existing regulatory requirements, and the adequacy of funding available for maintenance functions.

**Safety and Security** — The working committee for each element was also asked to develop evaluation parameters for the safety and security provisions applicable to that element. A particular concern was that such parameters address physical improvements required to assure asset protection from identifiable threats to the infrastructure involved.

## **Weighting Factors and Grading Criteria**

The weighting factors employed by each IRCC sub-committee naturally varied somewhat to suit the particular infrastructure element being assessed. However, in most instances, approximately equal weights were applied to the four criteria outlined above, with only small percentage adjustments needed to tailor the factors to the element. The IRCC did utilize the same numerical scale for assigning letter grades that was employed by the national ASCE organization in its Report Card series:

A = 90-100%

B = 80-89%

C = 70-79%

D = 61-69%

F = 40% or lower

## INFRASTRUCTURE REPORT CARD COMMITTEE MEMBERSHIP

Committee Member	Title/Affiliation	Element(s) Assessed
Anthony N. Lusich, P.E., G.E., <i>IRCC Chairman &amp; Executive Committee</i>	Lusich and Associates, Inc.	Atmospheric Quality, Energy, N. Calif. Delta, Waste Water
Sandy Bergam, P.E.	Private Consultant	Parks, Schools
Greg Black, P.E.	Palmetto Engineering & Land Surveying	Solid Waste
Donna Carpenter, E.I.T. <i>Executive Committee</i>	Sikand Engineering	Airports
Chris Clark, P.E.	Parsons	Highways, Roads, Transit
Amondo Garza, P.E.	Carollo Engineers	Waste Water
Janice Horcasitas, P.E.	City of Bakersfield	Atmospheric Quality
Ben Horn, P.E.	AECOM	Domestic Water
On Man Lau, P.E., G.E.	BSK & Associates	Flood Control
L. Dale Mills, P.E., <i>Executive Committee</i>	Hawley Mills Secor Consultants	Rail, Solid Waste
Warren Minner, P.E., S.E.	MSKA, Structural Engineers	Bridges, Energy
Terry Schroeffer, P.E.	Provost and Pritchard Engineering Group	Domestic Water
Kenneth Secor, P.E., <i>Editor &amp; Executive Committee</i>	Hawley Mills Secor Consultants	Airports, Bridges, Highways, N. Calif. Delta, Rail, Roads, Solid Waste, Transit
Adam Terronez, P.E., G.E.	Leighton Consulting, Inc.	Parks, Schools
William Wilbanks, P.E.	County of Kern (Retired)	Domestic Water, Flood Control



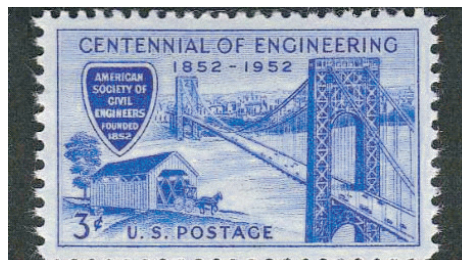
Founded in 1852, the American Society of Civil Engineers is America's oldest national engineering society, currently representing more than 144,000 members worldwide. The Society works to enhance the science and profession of engineering in service to humanity. Its aims include: the advancement of technology, the encouragement of lifelong learning, the promotion of professionalism and the profession, the development of civil engineers as leaders, and advocacy for infrastructure and environmental stewardship.

To achieve its vision for civil engineering, ASCE has established three strategic priorities:

- Infrastructure—Propose practical solutions to improve America's neglected infrastructure
- Competency—Establish educational and legal standards necessary to prepare professional engineers to address the future's most pressing challenges
- Sustainability—Embrace civil engineers' role as contributors to a sustainable world

In active pursuit of its aims and vision, the Society engages in a number of important programs: it offers continuing education courses and technical specialty conferences; it develops technical codes and standards for safer buildings, water systems and other civil engineering works; it publishes technical and professional journals, manuals and a variety of books; it works closely with Congress, the White House, and federal agencies to build sound national policy on infrastructure and engineering issues; and it supports research of civil engineering technology and materials. Through its sections and branches across the country, ASCE encourages policy-making at the state and local levels to reach its organizational goals.

The Southern San Joaquin Branch of ASCE was formed in 1971 as one of the seven branches within the Society's Los Angeles Section. With a current membership of approximately 200, its primary purpose is to provide support for the civil engineering community and the profession in Kern County. Leadership for the branch is afforded by a volunteer governing board elected by the membership. Branch activities include monthly meetings and networking opportunities, social events, recognition of regional civil engineering achievements, educational and informational seminars, information exchange on employment opportunities, and education and outreach to the community about the profession and the services it provides. The Southern San Joaquin Branch of ASCE actively supports the national ASCE organization in its efforts to raise public awareness of the disastrous condition of public service infrastructure in the United States, and in consequence, has provided strong leadership as a partner in the development of this *2009 Report Card on Kern County's Infrastructure*.





ACEC California is a more than 50-year-old, nonprofit association of private consulting engineering and land surveying firms. As a statewide organization, the association is dedicated to enhancing the consulting engineering and land surveying professions, protecting the general public and promoting use of the private sector in California's growth and development. The particular emphasis of the organization is participating in coalitions to affect State legislation and regulation. Its members provide services for all phases of planning, designing and constructing projects. Member services include civil, structural, geotechnical, electrical and mechanical engineering and land surveying for all types of public works, residential, commercial and industrial projects.

The American Council of Engineering Companies (ACEC) represents America's engineering industry on a national basis. Council members—numbering more than 5,500 firms throughout the country—are engaged in a wide range of engineering works that propel the nation's economy, and enhance and safeguard America's quality of life. These works allow Americans to drink clean water, enjoy a healthy life, take advantage of new technologies, and travel safely and efficiently. The Council's mission is to contribute to America's prosperity and welfare by advancing the business interests of member firms.

ACEC California is the country's largest member organization in the ACEC national body, and membership at the state level therefore includes automatic membership and representation nationally. The Kern Chapter includes some 22 of the region's most prominent and respected engineering firms as its members. One chapter member serves as the ACEC California State Grassroots Chair and is an officer on the ACEC California State Political Action Committee.



The American Public Works Association is an international educational and professional association of public agencies, private sector companies, and individuals dedicated to providing high quality public works goods and services. APWA is a 501(c)(3) charitable organization, incorporated in the State of Illinois.

Originally chartered in 1937, APWA is the largest and oldest organization of its kind in the world, with headquarters in Kansas City, Missouri and an office in Washington, D.C. Its membership encompasses 64 chapters throughout North America. APWA provides a forum in which public works professionals can exchange ideas, improve professional competency, increase the performance of their agencies and companies, and bring important public works-related topics to public attention in local, state and federal arenas.

The association is a highly participatory organization, with hundreds of opportunities for leadership and service, and a network of several dozen national committees in every area of public works. Governed by a 17-member board of directors, elected at both the regional and national levels, APWA is an open, flexible association with a diversified membership of 29,000 and a reputation for quality services and products.

Kern Branch is a part of the Central California Chapter of APWA. The chapter, formed in 1959, is in APWA's Region VIII and has approximately 300 members. Its membership coverage area incorporates eight California counties: Fresno, Kern, Kings, Madera, Mariposa, Merced, Stanislaus and Tulare. There are three or four chapter membership meetings each year, typically held in the Fresno-Clovis, Merced, or Tulare/Kings County areas. The Kern Branch also holds three to four meetings each year, usually in Bakersfield. Kern is known for its annual fund-raiser golf tournament, an event that helps support the scholarship program it maintains at the local community college.

## **A Few Words of Special Appreciation:**

The IRCC members are, of course, deeply indebted to the members of the local ASCE, ACEC and APWA organizations for their support of this Report Card project. Even though those organizations were the originators of the project, the continuing commitment of their memberships to it is still deserving of recognition as an important public service. Much volunteer time has been spent, as well as considerable funding from lean organizational budgets. It is to be hoped that those citizens of Kern County who review this document will understand and appreciate such commitment, as well as the sense of genuine concern underlying the efforts reported in these pages.

Particular thanks are due to a few individuals and organizations that made special contributions to assure that this publication could be completed and made available as an information resource on the status of Kern's public infrastructure:

Scott Johnson and his small staff at Calforms printing service have remained remarkably patient and helpful throughout an extremely extended editorial period as this document was being finalized, and Scott has maintained his already modest pricing over that same period.

Several contributors have provided funding for mailing costs to assure that copies of the report document could be sent to key leaders at the local, state and national levels. Among those contributors were—

- On Man Lau, P.E., G.E. (personal donation)
- Granite Construction Company
- Parsons

## **An Important Note:**

As this document has emphasized, Kern County's citizens and its business community will require progressive infrastructure systems if they are to thrive in the years to come. Additionally, many critical functional improvements will be needed to protect the county's environment. The letter grades assigned in this report identify Kern's infrastructure systems judged by the local ASCE Infrastructure Report Card Committee to be doing well and those in need of upgrading, in the context of perceived future needs. However, it is extremely important to emphasize that this Report Card is not an evaluation of the performance or efficiency of the local public agencies responsible for those systems, as they must operate within their available resources and the many other constraints that regulate their services. In fact, agency representatives contacted for information during the assessment process were generally most cooperative and frank in responding to IRCC requests for assistance.

## **Resources for Additional Information**

Readers seeking additional information or having questions about this *2009 Report Card for Kern County's Infrastructure* may contact Anthony N. Lusich, P.E., Chairman of the Infrastructure Report Card Committee. His e-mail address is [alusich@lusich.com](mailto:alusich@lusich.com). The full text of this report can be found on ASCE's Los Angeles Section website at <http://www.ascelasection.org/>.

For information about the American Society of Civil Engineers' national report card initiative and related subjects, readers are encouraged to consult the extensive materials on that subject available on the Society's website at <http://www.asce.org/>.

Although their websites do not contain additional information about infrastructure report cards, readers interested in knowing more about the American Council of Engineering Companies, California or the American Public Works Association may wish to view their respective websites at <http://www.celsoc.org/> and <http://www.apwa.net/>.





# 2009 Report Card for Kern County's Infrastructure

Atmospheric Quality	D
Energy	B
Solid Waste	A
Waste Water	B-
Domestic Water	B-
Northern Calif. Delta	D
Schools	B-
Parks	C-
Transportation	D+
Airports	B
Roads	D
Highways	D
Transit	C-
Bridges	C+
Rail	C+
Flood Control	D+
Kern County's Infrastructure	C-

