Maximizing California’s Resources: Recommendations for a Stronger Design and Construction Industry

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DESIGN AND CONSTRUCTION IS A $47 BILLION A YEAR COMPONENT OF CALIFORNIA’S ECONOMY—A PROFOUND ECONOMIC ENGINE. A REINVIGORATED DIVISION OF THE STATE ARCHITECT (DSA), RESTORED TO THE ROLE IT HELD DURING THE PREVIOUS BROWN ADMINISTRATION, CAN ONCE AGAIN BRING TOGETHER ALL THE PARTIES INVOLVED IN THE INDUSTRY, FACILITATING A COOPERATIVE RESPONSE TO THE CRITICAL ISSUES AFFECTING CALIFORNIA.
EXECUTIVE SUMMARY

The American Institute of Architects, California Council (AIACC) represents the interests of the 26,000 licensed architects in California. The AIACC supports the profession through its core mission: to better our social, natural, physical, and economic environment through design and construction.

The AIACC has watched with growing concern as the once strong Division of the State Architect (DSA) has been weakened and fragmented in recent years. Along with it, the State’s design and construction services have been distributed across many agencies at great cost to the State, the industry, and California’s taxpayers. Bureaucratic paperwork and State government over-regulation have produced an unsustainable path for the building industry, making the practice of architecture increasingly burdensome, discouraging clients from entering the market, and making it increasingly difficult for contractors and subcontractors to stay in the market.

Design and construction is a $47 billion a year component of California’s economy—a profound economic engine. A reinvigorated State Architect, restored to the role it held during the previous Brown Administration, can once again bring together all the parties involved in the industry, facilitating a cooperative response to the critical issues affecting California. By streamlining regulatory processes, providing a single source of leadership in high-performance building design, and promoting best practices, a renewed State Architect will help build the State’s economy and be a vital participant in providing needed jobs, improving our worn infrastructure, housing our growing population, and preserving our natural resources.

To accomplish these vital tasks, The AIACC urges the consolidation of the State’s construction related functions under the Division of the State Architect as a single agency responsible for policy and planning of the built environment, oversight of the design and construction industry, and leadership in environmental sustainability. Architects bring a depth of community vision - something greatly needed in these difficult times. We urge the appointment of a strong State Architect with the vision to lead the renewed organization insightfully and efficiently.
BACKGROUND
Recent advances in design and construction, as well as sustainable building technology, create a healthier, more productive built environment, while conserving precious resources and protecting the public investment. California’s private sector leads the nation in these developments.

From project delivery methods that increase project value, reduce waste and optimize efficiency through all phases of design, fabrication, and construction; to technologies that dramatically increase building energy performance; to methods for capturing construction and demolition waste for sustainable reuse, California’s design and construction industry continues to raise the bar. Of particular importance in today’s economy, all of these advances yield efficiencies that can significantly reduce both the construction cost and the operating cost of buildings.

From its founding in 1907, through the 1970s, and into the early 1980s, the Office of the State Architect (as it was then known) was an insightful and energetic partner with the private sector in such advances. During the previous Brown Administration, the State Architect—under the leadership of Sim van der Ryn, AIA, and Barry Wasserman, FAIA—developed the nation’s first government-initiated, energy efficient office building program, completing five model structures in Sacramento: the Gregory Bateson Building, the Paul R. Bonderson Building, the California Energy Commission Building, the Department of Justice Building (as well as regional facilities in San Francisco, Los Angeles, Oakland, Long Beach, San Jose and Santa Rosa), and the Employment Development Department Building. During the same time, the State Architect authored the Capitol Area Plan, an early, successful, and nationally recognized model for sustainable urban infill and community redevelopment. In addition, it introduced standards to assure universal access to state buildings for people of all ages and physical disabilities. These standards subsequently formed the basis for the national Americans with Disabilities Act.

Unfortunately, as a result of the diminution of scope and authority of the State Architect and the parceling out of its functions to dozens of State agencies, the State is no longer a sponsor of innovation, but rather an obstruction to it. As the AIACC observed in its response to the California Performance Review of 2004, “Currently, design and construction authority is fragmented among several state agencies, resulting in little accountability and the lack of uniform application of policy. The current process encourages duplication of services, waste, and inefficiencies. The proliferation of design and construction authorities encourages non-productive competition, the development of disparate policies and procedures particular to an individual authority, and increased...
the development of bureaucratic barriers that complicate the entitlement and building processes—without public benefit. The resulting project delivery process is expensive, time consuming, short-sighted, and ripe for conflict and litigation.”

Rather than saving money through the implementation of efficient project delivery methods, State government adds cost and delays building completion through redundant oversight. The fragmentation of State oversight of design and construction has contributed to disconnections among the several scales of development—from the individual building to the neighborhood, town, and region—hampering efforts to accommodate California’s growing population in ways that are at the same time livable, sustainable, and economically productive.

OPPORTUNITY

A unified voice for the built environment—a Division of the State Architect restored to its former coherence and authority—can facilitate progressive, cost-effective change. The State Architect should become once again a trusted advisor to the Governor, a resource for the Legislature, and a leader of the profession, bringing architects’ knowledge and skills to bear on the complex challenges facing the state.

Architects are facilitators, adept at gathering disparate views around a common table. They are collaborators who bring all members of the team together to improve outcomes. And architects are strategic thinkers, able to guide clients through the development process and anticipate the effects of strategic decisions. The inventive leadership of California architects in the face of complex problems is evident in four areas that will have a significant and measurable impact on the State and the health and welfare of its citizens for years to come: Resource Optimization, Project Delivery, Public Service, and Civic Infrastructure. Through a renewed Division of the State Architect, the State of California can again assume a leadership role in the thoughtful development of the built environment.

RESOURCE OPTIMIZATION

Buildings are responsible for 40 to 49 percent of our primary energy use, 72 to 77 percent of our electricity consumption, and 39 to 47 percent of our greenhouse gas production. Buildings account for 12 percent of our potable water use (not counting industrial processes), and construction and demolition waste accounts for nearly 40 percent of...
municipal solid waste.” Savings in each of these areas is not only crucial for a healthy, sustainable environment, but also for a healthy, sustainable economy.

Many of the most significant advances in high-performance, environmentally responsible building have been made by California architects. California has a wealth of knowledge and insight; to incorporate and disseminate this knowledge and insight for maximum benefit we need leadership and coordination at the State level.

**BUILDING ENERGY PERFORMANCE**

The US Green Building Council’s LEED® rating system has become the industry standard for sustainability. LEED has prompted a wholesale transformation of the building industry, instituting sustainability as a desirable and marketable characteristic of new structures. It operates by encouraging the adoption of a wide range of best practices, and the most recent iteration of its *Green Building Design & Construction* (3.0) guide requires performance reporting for energy and water following completion. Recent advances in “smart building” systems now allow real-time measurement of building performance, which not only tests the assumptions of established practices, but also allows for continual tuning of a building’s resource use. Again, California architects have taken the lead.

For example, the IDEAs Z2 Design Facility in San Jose is a net-zero energy, zero carbon retrofit project occupied since 2007. It uses less than one fourth the energy of a typical U.S. office by applying strategies such as daylighting, radiant heating/cooling with a ground-source heat pump, and high energy-performance lighting and computing. The remaining energy demand is met with renewable energy from a building-integrated photovoltaic array. In 2009, building owner and occupant Integrated Design Associates (IDEAs) recorded actual measured energy use of 21.17 kbtu/sf-year, with 21.72 kbtu/sf-year produced, for a net of minus 0.55 kbtu/sf-year. The building is also carbon neutral, with no gas connection and with carbon offsets purchased to cover the embodied carbon of the building materials used in the renovation.7 This project serves as a proof of concept for achieving the California Public Utilities Commission’s Strategic Energy Efficiency Plan, which targets net zero energy consumption for all new buildings by 2030.

More and more projects in California targeting net zero energy demonstrate a growing belief in the practicality of reaching for these aggressive goals. Zero energy California buildings in design, in construction, or completed include the Marin Country Day School, the Packard Foundation Headquarters, the Leyva Middle School Administration Building in Evergreen School District, a DNA research lab, the Exploratorium in San Francisco, and a grid neutral school campus in Oakland Unified School District.

While early adoption of high-performance technology may add to costs, these costs have rapidly declined, such that marginal increases in up-front costs are in the single-digit percentages—easily offset by life-cycle savings. The State Architect’s Grid Neutral Schools program, initiated in early 2009, promises to reduce utility costs for public schools by 20 to 30 percent.8 The State Architect’s expertise in this area should be applied throughout State involvement in design and construction. In addition, the increase in construction cost could also be offset by a more efficient approval and delivery system which would simplify regulation and approval through consolidation around a strong State Architect.
MATERIAL REUSE

The preservation of high-quality existing buildings is now recognized as a foundational principle of environmentally responsible development: such structures represent not only valued community assets, but also tremendous amounts of embodied energy in their materials and the processes that went into their construction. Similarly, building for the long-term—making buildings that will last and that can be repurposed as needs change—makes far more sense than designing “temporary” structures, especially for public uses. A third strategy—designing for the future reuse of construction components—is one in which California architects are leading innovators.

San Francisco-based EHDD Architecture—best known for the design of the Monterey Bay Aquarium—is a pioneer in the recovery and reuse of formerly discarded material resources. EHDD partner Scott Shell, FAIA, was the guiding force in the incorporation of fly ash—a byproduct of coal-fired power plants—into construction concrete, a now widespread practice that saves resources while improving structural capacity. The firm’s publication, *Design for Deconstruction*, is among the first efforts to rethink construction detailing to allow building components to be disassembled for reuse, rather than smacked with a wrecking ball and tossed into the dump. EHDD’s Chartwell School in Seaside, California, is a pioneering example of a building “designed to be unbuilt.”

The Portola Valley, California Town Center completed in 2008, is a sterling example of material reuse. The team of Siegel & Strain Architect, Goring & Straja Architects, and TBI Construction and Construction Management carefully dismantled the existing, seismically unsafe structures dating from the 1940s and creatively incorporated their materials into the new buildings.

Reuse of existing materials on the same site, as in Portola Valley, is one step in the development of a robust system of materials reuse. The greater challenge comes in recovering and storing materials for sourcing and use elsewhere at a later time. To fully realize the economies of material reuse will require an aggregation of markets; a well-coordinated State government can play a pivotal role in achieving it.

WATER

Some of the West’s most challenging problems have to do with water: on the one hand, a scarce, unevenly distributed resource; on the other, the increasing risk of seasonal and coastal flooding. As mentioned earlier, buildings use 12 percent of our water, much of which is used only once then sent down the drain. Along with storm runoff, this water burdens our aging infrastructure. California architects, along with innovative civil engineers and others, are developing cost-effective ways to capture and repurpose rainwater and graywater, not only reducing our overall water consumption, but also relieving our large-scale infrastructure by retaining water on the individual building site.

However, such efforts are slow to advance largely because of building code restrictions.
established during an era of plentiful water. For example, Berkeley’s first permitted residential rainwater collection system, designed by architect Geoffrey Holton, was completed just last year.

In 2009 the adoption by the California Building Standards Commission of a new graywater code (Chapter 16A of the California Plumbing Code, “Nonpotable Water Reuse Systems”) has begun to address these problems, but the confrontation of old regulations with new, economically and environmentally sustainable techniques will be a continuing problem.

Moreover, the total impact of buildings on water consumption goes far beyond its direct use in buildings. Half of our water is used in thermoelectric power generation,ix and buildings, as noted, are responsible for 72 to 77 percent of our electricity use. And the California Energy Commission estimates that 20 percent of electricity use in the state and 30 percent of natural gas use are associated with the extraction, treatment, conveyance, use (including heating), and disposal of water.x Like all natural resource issues, the conservation of our water resources requires integrative thinking. A unified voice for design and construction will facilitate timely solutions.

PROJECT DELIVERY

Beginning in 2002, The AIA California Council took the lead in developing what has become the concept of Integrated Project Delivery (IPD), a method that, through shared risk and reward, virtually eliminates the costly conflicts that have bedeviled the construction industry for decades. Developed in partnership with the Associated General Contractors of America (AGC), the Design-Build Institute of America (DBIA), and the legal and insurance professions, IPD demonstrates how the development of trust among stakeholders reduces risk and its accompanying costs.

Now jointly promoted by The AIACC and the national AIA, this newly available method has been employed in a number of major projects over the last few years, as documented in Integrated Project Delivery: Case Studies, by Jonathan Cohen, FAIA. Among them is one located in California: Sutter Health’s Fairfield Medical Office Building in Fairfield. What is most notable about all of the projects documented by Cohen is that in every instance, change orders (other than those initiated by the client) were entirely eliminated. That is, none of these projects experienced changes leading to higher construction costs after the start of construction. Imagine the savings to the taxpayer if such were true of all publicly constructed buildings in California.
Yet there are significant hurdles to the implementation of IPD in State-funded projects. The established practice of contracting with the lowest qualified bidder encourages underbidding on the part of prospective contractors, ensuring that the construction process will be filled with conflict and inundated with expensive change orders. IPD offers a proven alternative, but it requires a change of mindset, from adversarial to collaborative. It requires not only leadership, but coordination across all the agencies involved in State-funded construction. The current bureaucracy provides neither leadership nor coordination; a revitalized State Architect can.

PUBLIC SERVICE

The new millennium has seen a dramatic growth in the commitment of architects and architectural firms to public service. Architects have always understood their professional responsibility to encompass pro bono efforts on behalf of underserved communities; historically, such efforts have been undertaken for the most part on an ad hoc basis.

Encouraged by such international organizations as Architecture for Humanity and Public Architecture, both headquartered in San Francisco, architecture firms are now making pro bono service a systematic part of their business practices. For example, Public Architecture’s The 1% program, begun in 2002, currently numbers 900 firms nationwide among its participants, representing 285,000 hours of pro bono service pledged per year. Perkins + Will, one of the world’s largest architecture firms, with offices in San Francisco and Los Angeles, has established a firm-wide Social Responsibility Initiative, perhaps the first such program in the industry.

Pro bono contributions by architects come in all sizes. In Los Angeles, The HeArt Project provides arts workshops taught by many renowned local artists and designers to teens in continuation high schools. Its interior remodel, designed by Osborn Architects, was supplied in a single truckload from Home Depot for $197. Further up the cost scale, HOK (a worldwide firm whose chairman is based in their San Francisco office) celebrated its 50th anniversary by designing and funding the $500,000 construction cost of a Diagnostic and Treatment Center in Mbirikani, Kenya.

Such initiatives serve communities whose needs are beyond the scope of government programs—which, of necessity, must become even more frugal in their expenditures. State government at the highest level should be knowledgeable about and encouraging of such efforts. And the experience of architects in developing effective methods for pro bono contracting and project delivery can be applied across industries.
CIVIC INFRASTRUCTURE

California, like other state governments throughout the U.S., is faced with aging infrastructure systems that require expensive overhauls. And new infrastructure, like High-Speed Rail, will tax our budgets until its positive impact on economic development kicks in.

In addition to the hard costs of these projects, the people of California must bear the cost of the complex entitlement processes that such large projects invoke. A consolidated agency, overseeing all State-funded and regulated design and construction, can facilitate the smooth operation of the public process, identifying and correcting its inefficiencies; the current patchwork of agencies cannot. This is an important role for a restored Division of the State Architect.

However, infrastructure is not merely a technical concern. As we saw in the early work of the Office of the State Architect, such as Sacramento's Tower Bridge—and, indeed, in most public work of the 1930s—infrastructure can be not merely public but also civic. It can represent, nobly and beautifully, our collective aspirations and inspire pride in our collective achievements. With insightful guidance, infrastructure can be transformed from a collection of necessary evils in need of mitigation to a network of civic places that are enjoyed and cherished.

The linkage of all scales of development, from building design through regional planning, under the insightful guidance of a renewed Division of the State Architect, will not only smooth the technical processes but also ease the complex intersection of interests that renders the California construction landscape both fascinating and exasperating. Mustering the latest advances in project delivery and high-performance building, tapping the vast network of talented researchers and designers who are proud to call California home, the State Architect can simplify and elevate both public and private development, saving enormous sums of money while making California a better, healthier, and more delightful place in which to live.
CONCLUSION

Recent major advances in the design and construction industry offer invaluable tools for productive, cost-effective leadership in this $47 billion component of California’s economy.

To realize the potential of these tools will require a unified, authoritative voice for the coordination of all State-funded design and construction. Historically—and of particular note in the period from 1975 to 1983—the Division of the State Architect provided this voice. In order to help build the State’s economy, provide needed jobs, improve our worn infrastructure, house our growing population, and preserve our natural resources, The AIA California Council urges the Administration to:

1) Consolidate the State’s construction related functions under the Division of the State Architect as a single, efficient agency, responsible for policy and planning for the built environment, oversight of the design and construction industry, and leadership in sustainability. This renewed State Architect will once again serve as a trusted advisor to the Governor, a resource for the Legislature, and a leader of the profession, bringing architects’ knowledge and skills to bear on the complex challenges facing the state.

—and—

2) Appoint a strong State Architect with vision, to lead the renewed organization insightfully, vigorously, and effectively.
i AIA California Council, *California Performance Review: Ideas to restructure, reorganize and reform state government to enable the design and construction industry to be more responsive to the needs of the public* (Sacramento: AIA California Council, April 19, 2004), p. 2.


The lower figures represent the EIA’s “Public” and “Residential” sectors; the higher figures combine relevant factors from all of the EIA sectors, as analyzed by Architecture 2030, a non-profit, non-partisan and independent organization established in response to the climate change crisis by architect Edward Mazria in 2002. See http://architecture2030.org/the_problem/buildings_problem_why.


v David Kaneda, PE, AIA; Peter Rumsey, PE, FASHRAE; and Scott Shell, FAIA, “Less Than Zero,” *High Performance Building*, Fall 2010, pp. 6-22.

vi Division of the State Architect, *GRID NEUTRAL: Electrical Independence for California Schools and Community Colleges* (Sacramento: Department of General Services, 2009), p. iii.


viii Pauline Souza, AIA, LEED AP, “Water is Energy,” *arcCA (Architecture California)*, vol. 10, no. 2, Summer 2010, p. 34.

iv Geoffrey Holton, “Emerging Water-Smart Design,” *arcCA (Architecture California)*, vol. 9, no. 3, Fall 2009 (online version only).

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**RESOURCES**


