IMPROVING ACCOUNTABILITY FOR TRANSPORTATION PROJECT DELIVERY IN CALIFORNIA:

CAN WE GET THERE FROM HERE?

by

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EXECUTIVE SUMMARY

In California's current political environment, calls for greater accountability in transportation project delivery are issuing from many quarters. Politicians and project sponsors are realizing that the public perception of accountability is an important element in garnering public support, both for delivering projects and securing the funds to do so. As the search for new sources of transportation funding broadens to include the private sector, there is a growing awareness in the industry that the decades-long tendency to underestimate project costs and schedules is coming under intense scrutiny. The transportation industry is being pushed to become more accountable.

There have been efforts in the past to help provide greater accountability—within California, and in other states and jurisdictions around the world. The efforts in California have centered on legislative actions. One of the first efforts to change the way transportation projects are delivered in the state was to enable counties to create their own transportation sales tax measures. This meant that citizens could vote to adopt an expenditure plan for a transportation program that would be administered by a Transportation Authority in the county. The policy-makers who first envisioned this concept understood that there could be a higher level of accountability if an entity had to show that it was delivering specific projects within a specific timeframe. In 1995, SB 45 was enacted to try to streamline project delivery in the state and give back some of the decision-making power for the State Transportation Improvement Program to the regions, instead of keeping decisions centralized at the state level. Most recently, California voters adopted a series of bond measures for infrastructure in November 2006, which Governor Schwarzenegger is requiring to be implemented with a high degree of accountability. Toward that end, the Governor issued an executive order describing a policy for reporting and measuring progress of all the bond programs. The state may be at the beginning of a “perfect storm” that will change our accountability habits.

In order to be more accountable and better able to deliver on its promises, the transportation industry must understand the elements of delivering successful projects, especially mega-projects which are far more likely to be subject to cost overruns and unplanned schedule extensions. Because the consequences of such overruns or time extensions on very large projects are usually much more significant—and have the power to affect many other projects or even entire programs—than on smaller projects, it is additionally important to ensure that project sponsors and managers have the tools they need for success. These tools are not limited to appropriate technical resources for accurate cost and schedule estimating, but also include effective project management and leadership, good governance, appropriate and timely funding and financing, and comprehensive project risk assessment and management. Finally, it is important to be able to measure and report on progress—both at the project and program level.

The state of Washington has recently begun to overhaul its transportation decision-making process, as well its approach to project management, cost estimating, and risk management. It has implemented a highly transparent reporting system, known as the “Gray Notebook.” The Gray Notebook is a quarterly report compiled by a multi-disciplined team of managers; the process of working together to prepare the reports is such that there is no motivation or mechanism to misrepresent the data. Since the new system has been in place, Washington is showing marked improvement at meeting its commitments.

Although the lessons learned from the state of Washington—as well as research from scholars such as Bent Flyvbjerg of Aalborg University in Denmark—might suggest that there are

elements of California's transportation funding and decision-making system that could make improving accountability in the state difficult without significant changes, many within the industry are already considering this challenge. Incremental changes are currently being implemented that are intended to raise the bar for meeting budget and schedule commitments. With pressure to be more accountable coming from both within the transportation system—decision-makers want to be accountable and to hold project sponsors accountable—as well as from external sources—the public, politicians, and potential investors have their own stakes in accountable project delivery—the discussion is intensifying .

With this in mind, a small sample of project sponsors and decision-makers in California were interviewed to discuss their perceptions about the state of the existing system. The questions were focused on how funding decisions get made—what works and what doesn't—and which areas might be targets for change. Individuals identified logjams and problem areas that could and should be targeted to improve accountability. In synthesizing the comments and concerns of the respondents, it became clear that whether by radical reform or through incremental steps, changes must be made in order to inspire and reward greater accountability. The respondents were almost evenly split as to whether they imagined that the change would have to be fundamental or if it could be achieved incrementally, with slightly more believing that changes will have to be substantial. None of the respondents suggested that there is sufficient accountability in the system today.

Having made the case that there is a strong link between accountability and the opportunity to secure new funding, the study concludes that the system will have to undergo some level of reform in order for essential infrastructure replacement and upgrades to be implemented. Whether the industry can simply evolve from where it is now, or whether it will ultimately undergo a major transformation, it is apparent that the long-needed change is already beginning.

INTRODUCTION

The idea for this study grew out of conversations about a transportation bond measure proposed for the June 2006 California state ballot. The prospect of using $20 billion worth of general obligation bonds to fund transportation projects elicited questions from many quarters about accountability. It will take thirty years and almost $40 billion to repay this debt, and although $20 billion sounds like a lot of money, the transportation industry spends that in California *every year*. The industry's need to create reliable and sufficient funding streams has been a primary concern of transportation policymakers and researchers for about a decade. Not surprisingly then, many in the industry were excited that $20 billion of not-yet-programmed funding was about to come into the system. Some of us also had concerns that if we could not demonstrate a high level of accountability for this influx of funding, we might not get such an opportunity again. By the time the measure was voted on and passed (in November 2006), there were many formal and informal discussions in progress on the topic of how we might improve our accountability in project delivery.

Accountability is a word with many meanings. For the purposes of this study, accountability is defined as *meeting the commitments made regarding a project's scope, budget and schedule, as well as delivering projects that provide real benefit relative to their cost.* In an era of distrust for government, especially government spending, accountability also suggests being able to demonstrate that funds were spent on the "right projects." In the context of this study, accountability does not refer to placing credit or blame for outcomes, but instead is an approach to project delivery that presupposes a relationship between what project proponents say they will do and what they ultimately deliver. In particular, being accountable in project delivery means committing to keeping the cost of a completed project close to what was estimated at the time the project was approved and programmed. This idea of accountability also entails honest and timely explanations of the reasons for any schedule, scope, or cost changes.

The need to account for the proposed expenditures intended for a particular funding stream is a fact of life in California. Most Californians are familiar with voting on sales tax increments in order to fund transportation projects; what some voters may not realize, however, is that the ballots cast for these measures are, in fact, approvals of a specific proposed expenditure plan. Ever since counties began creating their own dedicated revenue sources for transportation, it has been apparent that the greatest public support for these tax measures comes when there is a real sense of accountability for delivering the projects that were identified in the expenditure plan.

Because California has been using county-based dedicated sales tax measures to fund transportation since 1984, and since most counties have passed their measures with a sunset of ten to thirty years, some counties have already gone through the process of reauthorizing their initial measures. Although a California Supreme Court decision in 1995 changed the threshold for passing transportation funding measures from a simple majority to a super-majority (requiring 66.7 percent of the vote) in 1995, there still appears to be a correlation between a county's track record of accountability on the initial expenditure plan, and the public's willingness to vote to reauthorize the measure.

Another discussion—this one about public-private partnership—has also been gaining momentum in California's transportation funding dialectic. Few in the industry doubt that public-private partnerships will be a feature in the transportation landscape in the years to come. It should be noted, however, that greater involvement of the private sector will bring with it

requirements for better accountability. This is because accountability is a foundation of private-sector funding arrangements. Investment banks are not willing to spend their capital on projects that have a constantly shifting price tag. In order to attract private investment, a project sponsor must be able to demonstrate the reliability of essential facts about the project, such as its scope, cost and schedule. While it is understood that large projects may encounter many unforeseen events and problems during the course of their development and construction, the private sector has an expectation that project sponsors understand and plan for these unknowns and still deliver on their promises.

As such, public-private partnerships focus intently on risk analysis and risk allocation. This means that the risks that have the potential to inflate project costs and schedules must be analyzed, quantified and planned for. Cost estimates and schedules that reflect a real understanding of project-specific risks may use probability-based ranges, rather than a single number or date, for cost and schedule. When private money is involved, it is typical to perform significant risk analysis and risk management planning before the project receives final funding approval—a noticeable change from the public-funding approaches of the past.

With the relationship between the ability to establish new funding streams and the need to be accountable for project delivery thus established, we should now consider another theme. This is the matter of the California transportation industry's poor track record of accountability. This paper is not intended to be an indictment of any project or agency. Rather the intention is to acknowledge and stipulate that a high percentage of projects—particularly those that fall into the "mega-project" category (total cost of $500 million or more)—tend to end up costing well over the budget that was presented at the time the project was programmed and/or approved for funding. There is considerable documentation of this fact and this paper does not intend to dispute or bring new data to the argument, although some of the most comprehensive studies in that vein have provided background for this work.

Understanding, then, that accountability is increasingly necessary for securing funding and that the California transportation industry has not always demonstrated a high level of accountability—especially for mega-projects—this study examines the question of how we might improve our accountability in transportation project delivery. What follows is an examination and discussion of approaches that have been adopted elsewhere, as well as results from interviews with a number of individuals who have worked within the California transportation profession for more than twenty years and who have a well-developed understanding of the decision-making process regarding funding and approving projects. It should be noted that this work does not include a discussion of the particular issues facing the transit sector of California's transportation industry. While many issues affecting transit are similar, this study is focused specifically on the process of developing and funding highway projects in the state.

We are fortunate not to be the first sector of the transportation industry to try to address problems with accountability. The efforts and experiences of others can inform our process and provide valuable lessons learned. The question at the core of this inquiry is whether California can implement some incremental changes that will effect greater accountability within the system as it exists now, or whether a more substantial reinvention of our decision-making and oversight process will need to occur. Bent Flyvbjerg's research, in particular, as well as a case study of Washington State, suggests that California's project development, approval, and funding process may need to be substantially restructured in order to bring about and support the desired

change.

Due to the limitations of time and resources, it is outside the scope of this research to effectively test the question of whether our system can remain substantially the same and still accommodate the demand for greater accountability. It will not be possible to report on how California changes its project delivery accountability track record until some future date—possibly five to ten years from now. However, it is this researcher's contention that several forces are currently at work that will bring about a noticeable change in the California transportation industry's accountability. Indeed, some of the catalysts for change are already influencing the system, such as the passage of California Proposition 1B and the increasing pressure on the legislature to allow more public-private partnerships.

Although there can be no conclusions drawn yet with respect to the state's success at delivering on its promises, this issue is—and will continue to be—at the center of our ability to fund our future transportation needs. Significant change in our project delivery accountability track record is inevitable if California is to continue to prosper and grow, and in so doing, continues its need for transportation-system maintenance, rehabilitation, and expansion.

While it may take a decade before we can definitively answer the question of how California will rise to the challenge of improving its transportation project accountability, for those of us interested in the future of transportation project delivery in the state, it is useful to examine the perceptions and operating assumptions currently at work. This study, in addition to summarizing some of the research existing on methods for improving accountability, presents the thoughts and opinions of a small sample of transportation project sponsors, planners, and decision-makers regarding accountability. The intent is to give some sense of the thinking and experience of those who operate within the current system and who will live with—and in some cases help implement—the changes that are coming.

BACKGROUND—SETTING THE STAGE FOR INQUIRY

The literature review that framed the inquiry for this study focused primarily on a selection of current writings (2000-2007) related to accountability in transportation project delivery, especially—but not limited to—the type of large-scale project frequently referred to as a "mega-project." Definitions differ as to what constitutes a mega-project; depending on when the particular research was conducted the project cost-threshold varies from $100 million to $1 billion. As a general rule, when reference is made in this report to a mega-project, it usually means a project costing $500 million or more.

A History of Cost Overruns, Expanding Scopes, and Overly Optimistic Schedules

Regardless of whether one considers $100 million or $1 billion to be the cut-off point for mega-projects, the reasons to focus on large projects are threefold. First, mega-projects seem to be more prone to budget overruns and schedule extensions than smaller projects; second, there is generally more public awareness of mega-projects, which may mean that our perceived accountability on mega-projects is assumed by the public to be representative of all projects; and third, the impact of a major discrepancy in the cost of a mega-project is proportionally much more significant when the base cost is of a high order of magnitude.

This last point means that a cost overrun on a mega-project has a greater impact on the overall funding climate than overruns on smaller projects. In real terms, a cost overrun in the tens or hundreds of millions of dollars—sometimes enough to fund other entire projects—may mean that other entire projects get cancelled or postponed. When the cost of overruns alone on a project equals the cost of doing one or more complete projects, it begs the question of whether the money is being spent effectively in the first place. Large cost overruns have other consequences as well, especially with respect to public perception of the appropriate expenditure of public funds. There may be additional specific effects on public perception when overruns must be paid for directly, such as when new tolls must be levied to pay for rising costs on a project.

Many projects are also plagued by an expanding scope of work, meaning that the scope of improvements included in the project continues to grow as the project progresses. This often happens when the project is poorly defined initially, or when—through the project development process—sponsors and other stakeholders see fit to include various additional improvements that may or may not be related to the project's stated purpose. Sometimes this is because there are deferred maintenance needs that may cost less to implement if incorporated into a major improvement, since mobilization and/or other costs would already be covered by the larger project. Sometimes it has to do with wanting to reduce impact on the facility or surrounding community by combining all planned repairs and improvements in the corridor at once, instead of spreading them out over time. Other times, a project's scope expands simply because of an initial failure to appropriately grasp the nature of the problem and the consequences and issues that may arise while attempting to solve it. Often, there are environmental or utility issues that are poorly understood when a project is initially planned. These invariably increase the scope, schedule and budget of affected projects.

While it is well-understood that the timeline for transportation projects is measured in years, if not decades, there is an ongoing challenge with the industry's ability to accurately estimate how long it will take to complete a project. Many of the same issues that contribute to driving up costs and increasing project scopes also affect schedules. Obviously, adding scope to

a project tends to delay its completion, but there are additional factors that influence (and usually extend) project schedules. These fall into two categories: endogenous—internal to the project development team, and exogenous—external to the project development team.

Endogenous delays can be related to staffing or resourcing problems, technical issues that take longer than expected to resolve, or simply being too optimistic at the time the original schedule is established. Endogenous delays can be seen as challenges that can be met by careful management and planning. Anecdotally, it appears that some endogenous delays may be reduced in situations where consultants are used, since a client agency may have more leverage to inspire timely project delivery due to the contractual relationship.

By contrast, exogenous delays are much more difficult to plan for or to manage. There are several reasons for exogenous delays, one of the most common of which is outside agency review and coordination efforts that take far longer than expected. In the case of regulating agencies, there is often a permit at stake, which means that the review is a critical element in the project development process. However, each agency has its own staffing, management and political issues to contend with—as well as varying degrees of commitment to the California transportation network. Not surprisingly, then, the amount of time and effort required to achieve concurrence or permit approval from the various state and federal agencies involved in the transportation project development process varies widely.

In addition to agency reviews often falling on the "critical path" of project delivery—meaning that other activities are stalled until that task is completed—there is a prevailing sense among project sponsors and designers of having no control over the agencies. Thus, there is a significant potential for external forces to influence the schedule—and to some degree, the overall outcome—of a project, with very little possibility for project sponsors to affect the respective schedule or level of engagement of those whose input or approval is needed. Regulatory agencies are not the only stakeholders with whom this dynamic of combined dependency and the inability to exert influence exists, but they are notable for their ubiquitous influence in transportation projects.

There are also contradictions in the current regulatory system. For instance, the current federal transportation act, the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), outlines an intention of streamlining the National Environmental Protection Act (NEPA) process, while the current federal budget for the regulatory agencies is making staff reductions an ongoing necessity. This affects agencies that routinely review and approve transportation projects or their impacts including the U. S. Army Corps of Engineers, the U.S. Fish and Wildlife Service, and the U.S. Environmental Protection Agency. With fewer staff to review projects and engage in the level of coordination typically required to secure project approval and the associated permits, the process is not particularly streamlined today. Again, there is little opportunity for project sponsors or managers to control the process or timeline for these reviews.

On projects prepared by entities other than the California Department of Transportation (Caltrans), the Caltrans review process itself can be a source of exogenous delays. This is not always the case, and there are many examples of good coordination and timely reviews, but by the same token, many projects do suffer from longer-than-expected or poorly coordinated Caltrans reviews. In situations where this occurs, it is common for the project schedule to slip. The closer the project is to completion, the more difficult it is to make up for lost time. As a

project approaches completion of the design phase and prepares to go to bid, timeliness becomes more important due to the need to release funds for construction.

Research by Others

In light of a trend toward sometimes spectacular cost overruns on the biggest transportation "mega-projects," transportation projects are a subject of interest in a variety of research disciplines besides transportation, including economics, sociology, and public policy. Of particular interest is the question of accountability in delivering transportation projects. While the particulars of project execution, governance and funding differ from country to country, researchers in the United States and internationally have looked for answers to questions including:

1. Why do transportation projects have such poor track records of accurately estimating costs and adhering to project schedules?
2. Are there certain approaches to funding, governing or managing mega-projects that correlate to successfully delivering project?
3. Are there certain project funding, governance, or management mechanisms that correlate to greater accountability in the process?
4. What is the relationship between risk and accountability?

This study draws on, and benefits from, the research of others. As such, it does not directly attempt to answer the questions above, but instead stipulates the existence of problems with accountability and, in large part, accepts the findings of Bent Flyvbjerg and others who have collected and analyzed a multitude of data that sheds light on those questions.

THE FUNDING CONNECTION

While some mention of the relationship between accountability and funding has already been made, it is important to understand the significance of the connection. In the U.S., and especially in California, any discussion of transportation policy always leads back to the issue of funding. In this state, we last raised the gas tax in 1994. At that time it was set at 18¢ per gallon, which is worth less than 13¢ in 2007 dollars.[i] The federal gas tax hasn't been raised since 1993, when it was set at 18.4¢ per gallon. Additionally, much of the state's transit—as well as a portion of the State Transportation Improvement Program (STIP)—is funded with a uniform state and local sales tax on gas, set at 7.25 percent.

With much of the state's transportation infrastructure at the limit of or well beyond its intended design life, the state has billions of dollars worth of deferred maintenance needs, as well as the need for new congestion relieving and mobility enhancing projects. While air quality requirements and other policy decisions may prevent us from adding lane capacity in many areas, there is still an enormous unfunded need for capital projects.

Thanks to Californians having passed Proposition 1A in November 2006, which strengthened the "firewall" created by Proposition 42 to protect transportation funding and began repayment of the funds borrowed from the State Highway Account, there will be a modest amount of new programming capacity in the 2008 STIP. Most of California's gas tax money, however, will henceforth be used primarily for maintenance projects rather than for new capital projects. One obvious implication of this is that there is a need for additional transportation funding in the state.

Currently, a primary source of funding for transportation projects, especially in congested metropolitan areas, is with the passage of county-wide sales tax measures dedicated to transportation. Typically a half-cent, the first of these tax measures was passed in Santa Clara County in 1984, although special legislation had provided for Los Angeles to institute a half-cent sales tax in perpetuity prior to that. There are now nineteen counties that tax themselves for transportation, with several others intending to do so in the near future. In 2005, local funding made up 47 percent of all transportation funding in the state, with the sales tax measures constituting about half of that.

ACCOUNTABILITY IN CALIFORNIA—PAST AND PRESENT

A Mirror for American Attitudes

It will not come as a surprise to most people that the current environment in California—as in the U.S, at large—reflects considerable public skepticism regarding accountability in government spending. It has not always been thus. Beginning in the 1930s and continuing into the 1960s, large public works projects often enjoyed considerable public support. Many of these projects were seen as positive steps toward "progress," which was viewed as being positive and as an overall benefit to society. Prior to the era of large publicly-funded projects, most transportation infrastructure in the U.S. was built with private funds, either through an entrepreneurial effort (such as the various toll bridges and roads), or under the umbrella of a "regulated utility," (such as the railroads).

With the rise of the environmental movement in the 1970s, and the corresponding environmental regulations that were implemented at the state and federal level, public attitudes toward large infrastructure projects began to shift. The 1980s brought additional awareness of environmental justice (i.e. efforts to address the propensity for environmentally damaging projects and industries to be located in poor, minority neighborhoods) and other previously unconsidered issues relating to the construction of large infrastructure projects. The 1990s seemed to solidify both a growing attitude of "Not In My Backyard" (known as NIMBY-ism) regarding many projects, and an overarching anti-tax sentiment. In the specific case of large public works projects, the general lack of support was often compounded by a particular distrust of government accountability. Californians have expressed these sentiments by supporting or voting for a variety of legislation limiting property tax increases, requiring higher voter thresholds to pass various types of taxes, and cutting many taxes and user fees, among other things. Although Californians consistently name transportation as one of their top-three concerns, there is sometimes surprisingly little public support to fund transportation improvements. It is understood that there is a connection between the perceived lack of accountability and the lack of public support for many transportation projects, although it is clear that there are many contributing factors.

Self-Help Counties

In 1984, aware that voters and taxpayers were developing real skepticism regarding government spending—including but not limited to transportation—a plan was developed in Santa Clara County to implement a half-cent sales tax dedicated to transportation. A proposed expenditure plan was developed that identified the specific projects on which the funds would be spent. The policymakers and politicians behind the idea believed that creating a dedicated funding stream and then being accountable for the way in which the proceeds were spent might shift the way the public perceived transportation spending—at least in Santa Clara County.

To a great extent, the implementers of Santa Clara County Measure A had it right. The half-cent tax was voted in for a ten-year period, with a promise of specific projects that would be delivered with the funds, as well as a commitment to do so within the specified timeframe. A new agency, the Santa Clara County Traffic Authority (SCCTA) was created to administer the program. It is noteworthy—in a discussion of accountability—to mention some specific details of how a proposal for a county sales tax measure is structured. When voters cast their ballots for such a measure, they actually are voting on a proposed expenditure plan. That is to say there is a

commitment made—in the form of the expenditure plan—as to what will be delivered and when. When the promises made in the expenditure plan are actually delivered, there is a great sense of accountability to the voters.

Part of the success strategy for implementing Measure A was to report on expenditures in a publicly available annual report, as well as to actively identify projects receiving Measure A funding. It was understood that a key element of the program's success would be to make citizens aware of the specific projects that were being constructed with the funds so they could easily see for themselves how their tax dollars had been used. This was part of an integrated approach to accountable project delivery that has formed the basis for the adoption and relative success of many local sales tax measures in California since 1984. With the success of this model now well established, almost every major election cycle in the state includes transportation sales tax measures in at least one county. The counties with transportation sales taxes are collectively referred to as "Self-Help Counties," a reference to their enhanced ability to both initiate their own projects, and to leverage the local funds to attract more state and federal funding by providing matching funds.

Inspired in part by the success of county-wide transportation taxes, as well as by the reduced "return to source" funds provided under Proposition 13, many cities are also beginning to consider local sales tax measures as a way to fund local street and road repairs and improvements. These jurisdictions view a local tax as an effective way to pay for necessary transportation projects. Part of what makes for success in passing these measures has been convincing voters that the local jurisdiction will be accountable for how the funds are spent.

A major change that has occurred since the passage of the first county-wide transportation sales tax measure is the California Supreme Court decision which determined that transportation tax measures must be passed with a super-majority of 66.7% votes. Not surprisingly, this requirement has posed a challenge in passing tax measures in some counties. Nonetheless, the counties that have either passed or reauthorized transportation sales tax measures since 1995, when the decision was rendered, demonstrate there is a strong enough perceived need for transportation improvement projects in many areas of the state to convince two-thirds of voters to say yes to a tax measure. The sense that voters have of the Transportation Authorities (TAs) being largely accountable in their project-delivery efforts is considered by those in the industry to be a major factor in the continued success of this approach.

Recent Efforts to Improve Accountability in California's Transportation Industry

In 1997, SB 45 (Kopp) was adopted in an effort to improve transportation project delivery in the state. It streamlined the STIP process and gave more power for selecting projects to the Regional Transportation Planning Agencies (RTPAs), instead of keeping the decision-making at the state level. As a result, 75 percent of the STIP goes to projects from the Regional Transportation Plans (RTPs), selected by the RTPAs and constituting the Regional Transportation Improvement Program (RTIP), and 25 percent of it goes to projects in the Interregional Transportation Strategic Plan (ITSP), selected by Caltrans and constituting the Interregional Transportation Improvement Program (ITIP).

SB 45 also defined four separate project phases: environmental, design, right-of-way, and construction. The project phase that precedes environmental clearance is known as project initiation and must be completed in order for a project to be considered for the STIP. Project initiation is generally accomplished with a Project Study Report (PSR), although other

documents are sometimes used. With the separation of project phases, SB 45 allowed projects to be funded sequentially by phase. The 2006 STIP guidelines acknowledge that the CTC recognizes an advantage in delaying programming the right-of-way and construction phases until substantial completion of the environmental phase because of the uncertainty of cost estimates before environmental clearance is secured for the project. The guidelines for the 2006 STIP are also the first to require performance measures be included in the applications for all projects. The intent of this is to "provide regional agencies and Caltrans the opportunity to demonstrate how the goals and objectives contained in each RTP or the ITSP are linked to the program of projects contained in each RTIP and the ITIP."[ii]

As of spring 2007, an additional force is at work pushing California's transportation industry to a higher level of accountability. In the aftermath of having passed the $19.9 billion state transportation bond measure (Proposition 1B), Governor Arnold Schwarzenegger issued Executive Order S-02-07 on January 24, 2007, setting forth requirements for accountability in *all* of the newly passed state bond measures. The order requires front-end accountability that establishes performance standards before any funds are spent; in-progress accountability that tracks and confirms that projects receiving funds are staying within their respective budgets, scopes and schedules; and follow-up accountability that will report on how well actual program expenditures matched the plan. See Appendix D for the full text of the executive order.

The first Proposition 1B program to be implemented under these guidelines is the Corridor Mobility Improvement Account (CMIA). Interestingly, the guidelines for submitting projects to be considered for the program were issued in November 2006, although the final program was not adopted until February 28, 2007. Because the governor's executive order—issued January 24—came out between the time project applications were started and the final selection of projects, many people in the industry are wondering if there will be difficulties in meeting project cost and schedule estimates. This is a reasonable question to ask, since many project sponsors made cost and schedule adjustments to their final project applications between the time of their original submittals and the final approvals. Caltrans director Will Kempton refused to sign applications that had been changed since the time the project had originally been submitted and selected. Changes to a project's budget would affect its respective benefit/cost ratio—which had, of course, been a key criterion in the selection of the projects. The proposed project schedules also factored heavily in the selection criteria, so the reaction to changing the schedule after a project had been selected was also understandable. Ultimately, project sponsors signed contracts committing to their original costs and schedules, but it may prove to be difficult to meet those estimates if they were prepared using old assumptions about being able to request additional funding or a time extension.

Now that the executive order has been issued, it is reasonable to expect that most applications for the other programs comprising Proposition 1B will be more likely to be prepared with a different set of underlying assumptions about preparing the cost and schedule estimates. It is worth noting, however, that—at $4.5 billion—the CMIA program is the single biggest element of the overall program, as well as being the largest that will be overseen by the California Transportation Commission (CTC).

ELEMENTS OF ACCOUNTABILITY

There are two overarching elements of accountability: the tools for success, and a means to measure and report progress.

It would not be reasonable to hold entities accountable for their actions without knowing that they have the tools to be successful. This includes being able to deliver projects and to measure and report on the progress being made. In order to meet the commitments made to the public and other stakeholders, project sponsors and implementing agencies should adopt mechanisms and policies that will lead to the effective delivery of projects as well as promoting reporting.

Transportation is a unique industry in that the highest management and decision-making positions—especially for highway work, as opposed to transit work—are often held by engineers or people with other similar technical backgrounds. Other businesses—especially those that involve such large-scale projects and huge sums of money—typically recruit leaders with strong business or policy backgrounds. Transportation, with its low-profile reputation, is far more likely to appoint its leadership from within the technical pool.

As such, many transportation project managers are stronger in their technical background than they are in management skills. While this is little discussed in the industry, it may be a factor in some of the challenges faced in project delivery. There are many companies and professional organizations that offer various types of "management training," ranging from short seminars to programs of thirty to sixty hours long. Even so, it is difficult to develop a truly integrated approach to managing complex engineering projects—made the more complex in California's heavily environmentally regulated climate—in such a relatively short time. While these programs tend, necessarily, to emphasize the mechanics of managing scope, schedule, and budget, there is little opportunity for the average project manager to understand project funding and finance, let alone the nuances of governance arrangements and other policies that can influence project outcomes. No one person on any project or at any agency needs to have expertise and experience at all the elements of success described below, but project sponsors and lead agencies should ensure that every project or program for which they are responsible has addressed and provided for each of these elements.

Tools for Success

In order to be held accountable for the commitments that are made regarding a transportation project's scope, schedule, and budget, it is necessary that the project sponsors implement policies and approaches that will lead to success. With the number of mega-projects currently planned and underway around the world, this is another topic that has been the subject of recent research. While details vary between researchers, considerable work has been done to identify elements of successful mega-project delivery. The categories developed by Roger Miller and Donald R. Lessard in *Strategic Management of Large Engineering Projects: Shaping Institutions, Risks, and Governance* provide a useful framework in which to examine the relevant issues. The areas of focus required to successfully bring a project to fruition, as identified by Miller and Lessard, are as follows:

1. Cost estimating and scheduling
2. Project management and leadership
3. Governance

4. Funding and financing
5. Risk assessment and risk management

Additionally, with accountability as the goal, it is important to be able to measure project progress and have effective ways to give accurate and timely reports on that progress. Following is a brief discussion of each of these elements for successful—and accountable—mega-project delivery.

COST ESTIMATING AND SCHEDULING

One of the primary catalysts in attracting global attention to transportation mega-projects is the increasing number of projects that experience huge cost overruns. When the initial estimated cost of a project is $500 million or more, even a ten- or twenty-percent overrun might be enough to fund an entire additional project. As overruns add up, other projects may be cancelled or delayed in order to cover the mega-project's shortfall. This is an all-too-common occurrence—and one with which most Californians are familiar.

In the case of schedule delays, there is also a cost. In the current world-wide construction climate, many materials are in short supply. Accordingly, the construction industry is experiencing rapid cost escalation of many key materials such as concrete, steel and asphalt. While the saying that "Time is money" has always been true in heavy construction, it is particularly—and sometimes painfully—true today. Many projects cite escalation costs over time as the most significant cause for cost increases and overruns from the original construction estimate.

Bent Flyvbjerg, et al, in the book *Megaprojects and Risk: An Anatomy of Ambition*, explores a phenomenon that has not shifted noticeably in over seventy years—the tendency in all types of transportation infrastructure projects to significantly underestimate costs. In his somewhat conservative research approach—comparing the actual cost of construction to the estimated cost at the time of project approval—he determines that nine out of ten mega-projects underestimate costs by an average of 28 percent overall. According to the study, which included 258 projects worldwide, overruns of 40 percent or more are common, with 80 percent overruns not being uncommon.

If one considers that project planning and programming often begin as much as a decade before project approval, and financial programming is always based on a cost estimate, one can imagine that the apparent overruns would be much higher if Flyvbjerg had used the initial planning-level estimates of project costs as his baseline. Flyvbjerg's approach—comparing cost differences between formal approval of a project and at the time of its construction—provides an effective and consistent benchmark, but it is probably more conservative (i.e. less) than the actual cost differential experienced by planning agencies and project sponsors.

A central point of Flyvbjerg's book is that, while we have far better data management tools available to us than ever before, there has been no noticeable improvement in our accuracy at estimating the costs of mega-projects during the last seventy years. As he searched for the reasons that we have been unable to improve our estimates by technical means, he found that there may be incentives for project sponsors, engineers, and champions to advance estimates that they *know* are low. One reason for this seems to be a culture of optimism within the business of project development. Flyvbjerg posits that professionals who design and implement transportation infrastructure will always be somewhat invested in seeing projects get built. Thus,

they may be likely to downplay potential risks—risks that could affect project schedules and budgets—in their initial estimates. As he delved into the systems by which transportation projects are funded and delivered, Flyvbjerg found considerable evidence that there is often more incentive to misrepresent potential project costs than to strive for accuracy. He calls it "strategic misrepresentation," although he acknowledges that the phrase is essentially a tactful term for lying. Flyvbjerg's work can logically lead one to ask the question of whether the system of transportation project development in California does provide some incentives or rewards for the strategic misrepresentation of vital project information. An interest in answering that question was one of the key factors that inspired this work.

Alan Altshuler and David Luberoff, in their book, *Mega-Projects: The Changing Politics of Urban Public Investment*, also examine the question of strategic misrepresentation of project costs and schedules. Altshuler and Luberoff considered project cost escalation as one factor in the trend toward building fewer transportation mega-projects in the U.S. They cited several studies, including Flyvbjerg's, and observed from the public policy perspective that the failure to accurately estimate the costs of public projects contributes to an overall erosion of public confidence in government. The lack of public trust in the transportation industry is a factor that has many consequences—some of which are discussed later in this study.

Obviously, a credible cost estimate and project schedule are at the center of project accountability. While many tools and resources exist to help engineers and project planners develop accurate cost estimates, it is important to understand that this process is not merely a technical exercise. It is fair to describe both the schedule and estimate as political in nature, especially in the case of a mega-project. Therefore, although there will always be a need for effective technical tools for cost estimating, it is important to look at all the factors at work in developing and presenting a cost estimate. An accurate and well developed cost estimate that—when reviewed by the project manager or decision-makers—is determined to be too high to pass political muster may be significantly revised before it reaches the public. As such, it is likely to be recorded as a cost overrun when the project is completed, appearing as a case of inaccurate cost estimating. Therefore, to develop accurate schedules and cost estimates, engineers need good technical tools, and project leaders and decision-makers need to be invested in transparency.

PROJECT MANAGEMENT AND LEADERSHIP

If cost estimating and scheduling are driven by tangibles, perhaps it is true that management often is driven by intangibles. Both elements, however, have something in common—the likelihood that they will be influenced by politics. Project management—and the choice of who should lead and how leadership should be implemented—can be subjective or sometimes almost accidental on public projects. This is not to say that there are not many talented and well-qualified project managers leading large transportation projects. But in the case of a public project, many individuals must participate in and contribute to the process. It will come as no surprise to anyone who has been part of a mega-project leadership team that there are many people all through the process who have the power to say "no" to a project and to stop or stall it, yet there is virtually no one who can single-handedly say "yes" to a project to keep it moving. As such, project management and overall leadership on a transportation mega-project are critically important to accountability, but also are subject to many unknowns and elements beyond anyone's control.

In *The Strategic Management of Large Engineering Projects: Shaping Institutions, Risks, and Governance*, Roger Miller and Donald R. Lessard examine factors that correlate to successful delivery of large transportation projects. They also included water and power projects in their evaluation. Because there is often considerable private funding involved in these other types of projects, not every lesson in the book is directly applicable to transportation mega-projects in the U.S. There is much of relevance, however, especially with respect to their findings relating to project management.

Miller and Lessard examine the relationships between various stakeholders in project development and delivery. One important observation that they make is in their examination of the relationship between a project's owners and its designers and builders. They determine that the traditional approach in the U.S., in which the owners adopt an "arm's length" approach to the design and/or construction team, is more likely to involve very little shared sense of control over the project's outcome. (This is the typical competitively bid Design-Bid-Build approach—our standard method for project delivery in California.) Instead, there is an emphasis on the cut-off points at which each stakeholder surrenders control. This approach affords little opportunity to jointly influence the project content without significantly altering the project contract.

In their book, Miller and Lessard find that no *one* approach to project management is appropriate for all project types. This is an argument well-taken, especially in light of the current push in California to try alternate delivery methods as a remedy for poor accountability. Instead, they recommend that within any management model an effort be made to take some kind of relational approach. The evidence clearly shows that partnering between owners and the executors of the work is a necessary—if not sufficient—ingredient for project success.

The Federal Highway Administration (FHWA) is also changing the way it considers and implements project management and leadership. In its report *Collaborative Leadership: Success Stories in Transportation Mega Projects*, an exploration is made of key elements in the successful collaboration required to deliver transportation mega-projects. The primary strategy the report identifies is the necessity of initiating extensive collaborations with all stakeholders as early in the project development process as possible. This includes building political will, and engaging the environmental community and regulatory agencies, the general public, business interests, funding agencies, and project sponsors. The report's case studies of three mega-projects—as well as two smaller but highly successful projects—give it a level of credibility that otherwise might be lacking. The detailed case-studies provide concrete examples of how to build coalitions for successful project delivery. These collaborative efforts can help co-create, or at least influence, greater accountability.

GOVERNANCE

Although not at the center of most accountability discussions in California, governance agreements nonetheless play a significant role in determining both accountability and success in project delivery. Governance agreements give shape to the process and to the recourse available to project sponsors, lead agencies, and other formal stakeholders. As one example, the ubiquitous cooperative agreements that define relationships and responsibilities between agencies have been the focus of recent reform efforts under the current Caltrans director.

In California, we have a track record of taking almost as long to finalize our cooperative agreements as we do to complete the projects themselves. While the "co-ops," as they are usually called, are not the only element of governance within the project development process, they

define the funding agreements between the state and local agencies, as well as who is responsible for what effort of the process. There are many other governance arrangements that determine elements of how a project is developed and implemented, as well. State legislation governs how and when projects are funded (SB45), the process by which projects may be added to the State Transportation Improvement Program (made up of the Regional and Interregional Transportation Plans), and how the state may procure construction services. Legislation also defines how projects are put into the Regional Transportation Plan—thereby making them eligible for various types of funding. The California Environmental Quality Act (CEQA), and the National Environmental Protection Act (NEPA)—through its interpretation in SAFETEA-LU—also act as governance agreements, defining the processes by which proposed projects receive environmental clearance and permits for construction, as well as how they mitigate for the impacts they cause to the environment. While cooperative agreements can be project-specific, and are, at a minimum, agency-specific, a variety of state and federal laws provide structure and constraints to all projects unless otherwise specially legislated.

In a state as large as California, it is not surprising that there have been a number of instances when project-specific legislation is enacted to make possible an atypical approach to delivering a particular project. There has also been legislation to prevent specific transportation projects from going forward. More commonly, however, legislation has been sought in order to facilitate non-traditional delivery methods, in the form of pilot programs or other demonstration approaches. In the past, this has included using the "design-build" model and creating "public-private partnerships."

Because some project sponsors are well aware of how governance agreements can shape a project's success or failure, there are also cases of unique co-ops that have been developed specifically to institute a non-standard approach to the relationship between the state and the local agency. For instance, in the case of the Caldecott Tunnel Improvement Project, a co-op was developed to establish the respective roles of staff at Caltrans and the Contra Costa Transportation Authority (CCTA), as well as to formally define a procedure for resolving conflicts or other challenging issues within the team structure. Because the design team was made up of both Caltrans staff and consulting staff hired by the CCTA, formal partnering activities were also implemented to help develop team members' sense of working as an integrated group.

In *The Strategic Management of Large Engineering Projects: Shaping Institutions, Risks and Governance*, Miller and Lessard devote considerable effort to explorations of governance arrangements that appear to correspond with successful projects. Because they include a variety of privately sponsored projects in their study, some of their observations have little direct carry-over to transportation mega-projects. They do outline some useful guidelines, however. First, they identify three types of governance, which—in the context of managing a mega-project—is defined as the process of directing multiple firms, agencies & organizations that are both *operationally autonomous* and *structurally coupled* (on a project) through reciprocal interdependencies.

Because they identify turbulence, rather than technical difficulties, as the most common factor leading to mega-project failure, Miller and Lessard support a form of broad governance that provides a structure within which to face—and resolve—the inevitable periods of turbulence that nearly every large project experiences at times. The turbulence can be created by things like unforeseen cost increases, organized resistance to the project, funding problems, or political

shifts or instability within the sponsoring agency. Their research concludes that mega-projects that fail often do so because they enter "spirals of disintegration" when the project encounters significant turbulence. A well-thought-out governance structure is essential in helping a project endure turbulence intact.

Altshuler and Luberoff, on the other hand, identify the modern era (1970s to the present) as a period characterized by the motto of "do no harm." This, they say, is a legacy of the environmental and economic justice movements. They argue that fewer and fewer mega-projects will be built in the U.S. because of the governance structures present in society that make it virtually impossible to economically meet requirements to avoid, minimize, or mitigate impacts. While it is true that the era of building freeways through central cities and pristine land has effectively ended, Altshuler and Luberoff also acknowledge that there will continue to be a need for large-scale transportation projects. As such, they recommend several criteria be used in evaluating public investment proposals:

1. Weigh the benefits to society as a whole—rather than just immediate stakeholders.
2. If specific private entities stand to benefit from the project, they should bear some of the cost and risk.
3. Projects should not harm individuals, communities, or the environment.
4. Decisions to proceed should be made in an open and democratic manner.
5. Court action should be an available remedy, but not as a stalling or extorting tactic.

The criteria should be considered in strategizing the development of appropriate governance for successful, accountable transportation projects.

FUNDING AND FINANCING

Without funding, there are no projects. In California, we have been undergoing an incremental reduction of the buying power of the dedicated funding sources for over a decade. Additionally, transportation funding was subject to diversion into the General Fund for several years prior to the implementation of Proposition 42, which established a so-called "firewall" to protect money collected for transportation purposes. However, since Proposition 42 had a loophole that allowed for the money to be diverted during fiscal "crises," there were several years in the early twenty-first century during which the funds continued to go elsewhere.

In addition to the diversion of funds, the state is also suffering from a gas tax that is not indexed for inflation and has not been raised in thirteen years. This coincides with unprecedented cost escalations in essential building materials as well as mounting deterioration of roads and highways. When combined with continually increasing numbers of drivers and overall vehicle-miles-traveled, it is clearly not an overstatement to say that California is in a transportation-funding crisis. It goes without saying that securing funding is integral to a project's success. It also clear that, with every available transportation dollar spoken for, the funding and financing tied to a project are a critical element in maintaining accountability. With too little money to meet the identified need, more attention is being paid to where our limited funds are going.

Flyvbjerg takes a strong stand regarding project funding and accountability, especially for mega-projects. In fact, he presents a formula for accountability that requires that approximately one-third of funding come from private sources. He makes the case that the level of scrutiny applied when funds do not have a government guarantee is a potent force for accountability. His

research bears out this argument.

Miller and Lessard draw a similar conclusion, though they stop short of recommending a specific formula. It would be hard to argue that private financing on any project does not bring with it closer scrutiny than does pure government financing. In her March 6, 2007 *Testimony before the House Subcommittee on Transportation, Housing and Urban Development Appropriations Committee*, Patricia A. Dalton of the Government Accountability Office (GAO) identified financing of the nation's transportation infrastructure as a high-risk issue for her agency this year. She acknowledged that the revenues to the Highway Trust Fund are eroding due to inflation, increased fuel efficiency and increasing use of alternative fuel vehicles. There is a forecasted negative balance in the Trust Fund of $14 billion by 2012, according to the Congressional Budget Office. Dalton reports that a commission will be reporting before the end of 2007 on how to get the Trust Fund back on a sustainable path. It is expected that the solution will include tolling and other private sector involvement. If implemented, this would bring with it a necessarily higher standard of accountability than has heretofore been the norm.

One question not clearly answered in the literature is the economics of private-sector financing for highway projects, which constitute a large share of present and future transportation mega-projects in California. Obviously, where there are opportunities to create toll roads there is a natural nexus for private investment. However, not all highway projects are suitable for tolling. Nor is there currently the political will to initiate a new era of large-scale toll-road construction. There is a clear indication from the financial community of its interest in getting involved in the California transportation business, but it will remain to be seen what contribution private sector financing will make to California highway projects.

RISK ASSESSMENT AND MANAGEMENT

Virtually every source considered in the literature review for this work included risk assessment and risk management in the overall strategy necessary to successfully deliver projects and improve accountability. The worldwide trend toward paying greater attention to risk management was largely initiated on the heels of several mega-projects that either failed to meet expectations or that developed significant unexpected problems during the end of the last century. Not all of these were transportation projects, but the Channel Tunnel and Boston's Central Artery/Tunnel project were among them. California's San Francisco/Oakland Bay Bridge project could arguably be considered as another example. While the details of implementation may vary between sources, there is little disagreement on the value and importance of identifying, analyzing, and seeking to manage project risks as a key to effectively delivering mega-projects. Caltrans has recently begun requiring a risk management plan for all projects prior to formal project approval.

The current approach to risk assessment and management is to begin early in the project development process to identify potential risks to the project. In the initial stages, this is based on knowledge of similar projects, as well as on what is known about the specific conditions of the project at that phase of project development. Each risk, once identified, is assessed as to its likelihood of occurring and the relative impact that its occurrence would have on the project. In this way, it is possible to weight risks relative to each other and focus management efforts particularly on risks that either have a high likelihood of happening, or that are likely to have a significant effect on either the project budget or schedule or both. As the project advances, the risk management plan is revisited, reanalyzed, and revised to reflect the current knowledge.

Once a risk is identified and quantified as to its likelihood and potential impact, the next step is to develop an approach to managing it. Responsibility for each identified risk is assigned to one of the project partners or stakeholders who leads the effort to minimize, manage, or accept it. A fundamental concept in risk management is to allocate each risk to the entity that can best mitigate or absorb it. It should also be understood that in order for an entity to be responsible for accepting a risk, there may need to be a corresponding benefit to properly mitigating, managing, or avoiding it. In the case of a sponsoring agency, the reward may simply be to keep the project moving forward; in the case of a private entity who is asked to bear risk, the reward may need to be financial.

Flyvbjerg also emphasizes that preparing "worst-case" scenarios should be part of any accountable project delivery approach, since mega-projects may be more likely than smaller projects to encounter potentially catastrophic events. Worst-case scenario planning is additionally essential for mega-projects because the relative impact of a worst-case on a project that has already been estimated to cost hundreds of millions of dollars may be bad enough that the project never recovers from it. By doing scenario planning and considering what the worst possible outcomes could be, project teams can plan and be prepared for eventualities that might otherwise signal the end of the project.

Measuring and Reporting Progress

The previous sections outline several factors that have been shown to affect success, and therefore, accountability in project delivery. It should be noted, however, that a project can make use of a variety of best practices regarding management, leadership, governance, funding, and risk and *still* not be perceived as providing accountability. The essential ingredient for real accountability is accurately measuring and reporting on progress. There must be some regularly updated documentation that provides reliable, real-time data on cost and progress to date.

It could be argued that some of the elements of successful projects identified above can be missing and a project can still provide a high level of accountability if there is regular reporting. The elements of success described above constitute the tools that one uses to deliver a successful project. There is one tool with accountability as its sole purpose, however—the status report. Most public entities that implement transportation projects have some level of reporting required as part of their budget and allocations process. However, the execution of such requirements varies widely and it is not uncommon to see a brief annual summary accepted as a sufficient report on major projects.

In agencies that hold accountability as a central goal, however, there is a noticeable trend toward more thorough reporting. While it may not be necessary to provide multiple detailed pages of information, there is an effort made to give accurate and timely information regarding cost and schedule status. It is also typical to provide some explanation for any cost increases or schedule slippage at the time they are incurred. This stands in stark contrast to the approach of suppressing such information and only publicly revealing "the bad news" when it can no longer be hidden or denied. Boston's Central Artery/Tunnel Project and the Bay Area's San Francisco-Oakland Bay Bridge are two projects that seem to have taken the latter approach rather than adopting a real-time accounting of progress and project costs. Both projects have been subject to significant cost increases and schedule slippage, in addition to considerable public skepticism at the effectiveness and accountability of their respective project sponsors. By avoiding airing schedule and cost changes, projects attract criticism and contribute to the attitude of public

distrust regarding mega-projects.

By contrast, the FHWA has a series of reports on collaborative project management available on its Web site (http://www.fhwa.dot.gov/programadmin/mega/) that discusses various successful mega-projects and includes lessons learned from each. In an article about the Alameda Corridor, a major rail undergrounding project completed at the Ports of Los Angeles and Long Beach, one of the reported lessons learned is as follows: "The faster you get to the press with changes in funding the more likelihood that the focus will be on a solution to the problem rather than who to blame [sic]."[iii]

Agencies that take seriously their need for credibility with the public are coming to understand that reporting—honest reporting—on progress is essential. Currently, almost every project sponsor in California understands the value of identifying the projects that have been paid for by the public. This is the reason that most highway construction projects include at least one sign with a message identifying the funding source(s) for the project along with a message to the effect of "Your tax dollars at work". Making the connection between the projects that are being funded from a specific program and providing regular updates on cost and schedule are not the same thing, however.

Today, there is a fledgling movement in California to move toward more regular and easily accessible progress reporting on transportation projects. The San Diego Association of Governments (SANDAG) administers San Diego county's half-cent sales tax, which was first passed in 1988 and was reauthorized in November 2004 for a forty-year extension. SANDAG has recently implemented something it calls the Dashboard. Accessible to the public through a Web site, it is intended to provide real-time status reports on the major projects that comprise SANDAG's transportation sales tax measure program. There is a simplified version of the cost and schedule data that anyone can see, with a more detailed version available for those with access to the internal website.

In order to achieve real accountability, it is important to measure the progress that is being made and to report on it with regular, honest updates. Only with clear communication about what is being planned, what is being done, what was delivered, and how close the estimates of cost and schedule were can an agency achieve the transparency that will help regain or maintain public trust. That trust is a key ingredient in continuing to fund and build transportation solutions in California.

A Study in Improving Accountability: Washington State

The Washington State Department of Transportation (WSDOT)—in a study that was initiated in 2002 in an effort to improve its accountability record—identified a number of key areas for improvement. From that evaluation process, guidelines for more effective project and program management were developed. The guidelines for implementing WSDOT's approach to accountability lay out an interactive strategy for project management that contributes significantly to Washington's vastly improved project accountability.

In *Review of Accountability Mechanisms for Washington State Department of Transportation*, authored by the state of Washington's Joint Legislative Audit and Review Committee (JLARC), guidelines are presented that describe "performance journalism." The incorporation of regular reporting into WSDOT's new system for accountability is based on the adage, "What gets measured, gets managed". Among other things, this approach to documenting

project progress relies on open and frank communication between project managers and executives. Because a broad cross-section of management staff is involved in the reporting effort, there is little opportunity or incentive to hide project data. Instead, project managers and executives regularly discuss project performance—which is increasingly resulting in improved and accountable project delivery.

In addition to identifying areas where project management did not appear to be working effectively, WSDOT also found its consistent failure to accurately estimate project costs a key area for improvement. Top department officials understood that no overall improvement in accountability could be achieved without providing a better framework in which to develop project cost estimates. As a result, WSDOT adopted a radically different approach to cost estimating from what they had been using in the past.

The new cost estimating system—known as Cost Estimating Validation Process (CEVP)—is based on a cost estimating validation process that is similar to that used by larger contractors and construction management firms. It uses a probabilistic approach to assigning likely costs and requires that the project management team develop a good risk assessment and management plan. The output, rather than consisting of a single value cost estimate, consists of a range of costs that are tied to a probability curve. The relative probabilities of various cost ranges are in turn, tied to the risk assessment and management plan. The question of which value or range of values to use in programming the project then becomes one of policy: are the project risks such that it makes sense to use the 60 percent likely cost? or does the particular project merit using the 80 percent estimate? or some other value? Some projects are actually *programmed* with a cost range, rather than with a fixed value. This is new territory for project planners, who have always expected a precise cost estimate, but it allows a more realistic approach until the project design has progressed or construction has begun. Details on CEVP can be found at http://www.wsdot.wa.gov/Projects/ ProjectMgmt/RiskAssessment/.

The specific reporting effort that supports and delivers WSDOT's accountability program is known as the "Gray Notebook." It is the detailed quarterly report that provides updates and measures of effectiveness on each project that the department is undertaking. Among other things, each project is evaluated by comparing the baseline project cost estimate with the actual current estimated construction cost. An easy-to-read table lists each project with an annotation of "over budget," "on budget," or "under budget." In the December 2006 Gray Notebook, seventeen out of nineteen projects from the FY '03–'05 program are noted as being "on- or under-budget." This marks a sea change from the years prior to implementation of CEVP and the Gray Notebook. The Gray Notebook is available to the public online at http://www.wsdot.wa.gov/accountability/GrayNotebook.pdf.

PERCEPTIONS FROM WITHIN THE SYSTEM

As mentioned earlier, part of the inspiration for this work came from considering how well California's existing system of project development and decision-making supports accountability. While this researcher's own experience of working within the California transportation industry for over ten years has led to some speculation on the topic, the intention of the research was to seek the perspectives of people who have worked within the system for twenty years or more. Particularly, the intention was to interview individuals who are involved—in one way or another—in the decision-making process regarding project funding.

Accordingly, a short set of interview questions was developed, intended to elicit perceptions about how the system operates today, as well as thoughts on how it might improve. The project began with an initial set of ten questions, which was piloted, and then refined into a final set of six questions that was asked of all interviewees. The interviewees included project sponsors and decision-makers—primarily drawn from Executive Directors and staff from various Transportation Authorities as well as from the California Transportation Authority staff and its board.

The question set was as follows:

For the purposes of this study, accountability in transportation project delivery is defined as: meeting the commitments made regarding a project's scope, budget and schedule; delivering projects that provide real benefit relative to their cost.

There is considerable data demonstrating that a high percentage of transportation projects—especially those over $100 million—end up costing more to deliver than was estimated at the time the project was programmed to receive funding.

1. What effect do you think this has on the transportation industry?

2. What information do decision-makers need in order to make good decisions about what projects should be approved for funding?

3. Do you feel that decision-makers get the information they need?

4. What factors do you feel affect our ability to keep our project-delivery promises?

5. Given the uncertainties inherent in the project development process, is there some project development phase at which you think it is reasonable to make a commitment to a cost and schedule for which the project is then held accountable?

a. If so, when?

b. How would that accountability be implemented?

c. If no, why not?

6. Do you think we need to make fundamental changes to our approach to project programming to achieve greater accountability, or are there incremental changes we could make to our current system that would make a difference?

The purpose of soliciting input from Executive (and Deputy Directors) at various Transportation Authorities (TAs) was twofold. First, because the TAs have their own funding source in the form of a sales tax, their staff understands the process of evaluating projects and approving them for funding. Second, because the local sales tax funds are used as matching funds to secure state and federal funding for projects, TA staff are also well-versed in the process of requesting project funds from the California Transportation Commission (CTC). Being in the position of both administering a funding stream and being responsible for seeking additional funds from the CTC, gives TA staff a unique perspective on accountability.

The purpose of soliciting input from the CTC staff and board members was based on the unique position of the commission: it is less involved with specific individual projects and so relies on the information it receives from project sponsors to help it make decisions. On the other hand, it is held somewhat accountable for the decisions it makes and in turn, seeks to hold accountable those to whom it grants funds. The CTC, as a decision-making body, is at the center of any statewide effort to improve accountability in transportation project delivery. In addition to staff from the TAs and the CTC, two consultants and a political policy advisor were also interviewed. They were selected because of their experience in the industry, and their longtime interest in—and contributions to—the ongoing discussion of improving accountability.

Interviews were primarily conducted either over the phone or in person. In one case, written responses to the questions were submitted. The interviews took place between April 20 and June 11, 2007. The format of the interview process varied somewhat. In every case, each question was asked and responded to. However, since the interviews were performed without being recorded—to preserve anonymity and encourage candor—some of the interviews were more freeform than others. This was intentional, as the questions were designed to elicit both long-standing opinions, as well as to inspire new consideration of the topic. The interviews ranged in length from just under a half-hour to close to two hours, with the average being just under an hour.

While the respondents are primarily based in Northern California, the questions would not have differed substantially if the respondents had been primarily from Southern California. Although each respondent spoke from his/her respective experience, the questions are reflective in nature. The differences noted between respondents tended to correspond more closely to each person's role in the system, rather than to any other factor. Obviously, personality and personal interests within the industry were a factor in individual answers. Overall, there was some correlation in how questions were answered based on whether the respondent was from a TA, the CTC, or a consulting firm. Because of the nature of the questions, there is no reason to believe that regional differences would have been more significant than differences in personality or roles within the system.

In reporting the responses to the interview questions here, an effort has been made to maintain the anonymity of each respondent. Respondents were encouraged to be as candid as possible, with the promise that no answers would be attributed to individuals—although the names of the respondents are included in Appendix A. As such, responses are not identified by person or role, but are instead reported collectively. Following is a discussion and summary of the responses received to each question.

Question One

There is considerable data demonstrating that a high percentage of

transportation projects—especially those over $100 million—end up costing more to deliver than was estimated at the time the project was programmed to receive funding.

What effect do you think this has on the transportation industry?

It should be noted that in the process of discussing this question with various respondents, it was acknowledged that schedule slippage is part of the same problem described above. In answering, several respondents assumed—appropriately—that the discussion could be interpreted to include the consequences of chronic schedule slippage, in addition to chronic cost overruns.

In answering this question, virtually every respondent mentioned "credibility" at some point in the conversation. In essence, everyone agreed that the transportation industry suffers from a credibility problem tied to its history of chronic cost overruns. Some of the interviewees identified a lack of credibility as the single biggest challenge that transportation faces, others saw it as only one problem among many. Regardless of whether a respondent considered a lack of credibility to be the biggest problem or not, virtually everyone agreed that there is widespread public skepticism regarding the transportation industry's ability to keep its promises. Several respondents made the connection that distrust of the transportation industry is a distinct but integral part of an overall distrust of government.

Another effect identified as fallout from chronic cost overruns was described by several respondents as a "public relations" problem. This is related to credibility, but it also refers to something with specific implications—the public relations problem was cited as a reason that it is hard to get the public's attention regarding a variety of transportation issues, including but not limited to funding. It seems that the overall lack of credibility hampers our ability to educate the public and our state legislators about transportation issues, which in turn prevents us from being able to raise the funds and develop the policies that might ultimately contribute to improved accountability. Not only do we have a hard time educating people about the issues, but the public relations problem also affects us when agencies try to get support for major projects. Even when the need for the project is well-documented, there can still be resistance to the process that comes, in part, from a general distrust of the industry.

The frequency with which transportation agencies are targeted by the media was also cited as directly related to chronic cost overruns and schedule slippage. Caltrans, especially, is often the subject of well-publicized journalistic criticism. There is also a particular kind of fallout that gets expressed by the voters, especially in the case of trying to pass sales tax measures. More than one respondent acknowledged that while Californians often cite transportation as a top issue of concern, there is sometimes reluctance to vote to pay for transportation improvements. It was suggested that this seems related to an overall lack of public trust in the transportation industry.

Many of the respondents also made the direct connection between problems with delivering projects for the estimated cost and the industry's ability to *effectively* spend the funds it has. In the case of allocated funding, cost overruns and schedule slippage can mean that money sits unused, or is used later than planned. This often happens when contractor bids come in significantly higher than the engineer's estimate and the project must be re-advertised before the contract can be awarded. In these situations, however, it had been assumed that the money would be used in that particular month or quarter. Because the construction industry has recently been experiencing inflation at a rate greater than the average inflation rate, money that sits unused—

even if only for a few months—will almost assuredly have less buying power when it's finally spent.

Schedule slippage, in particular, was also cited as having other specific consequences related to the timely use of funds. Several respondents mentioned that funding set aside for a particular project could have been used to fund something else if it was known that the programmed project could not meet its schedule. At the state and federal level, there are processes that make unused funds available for other projects. However, this is not the most effective use of the funds because, as mentioned previously, even sitting unused for a short time reduces the buying power of funds in the construction market. In addition to being able to purchase less with money that has been idle for a time, the cost of the project that has been delayed will ultimately be more when it finally goes to construction. This effectively results in paying twice for the inefficiencies of a schedule slip on one project.

Another effect of chronic cost overruns that was cited by more than one respondent is the role that politics plays in the decision-making process. It is perceived that politicians may be more likely to get involved with advocating for projects and project funding today in part because of the industry's poor track record. It was also mentioned, however, that there can be a reciprocal effect, i.e. political influence can actually make it more difficult to meet cost and schedule commitments. This can be seen when the project development process is expedited to meet a political mandate, for instance. The quality of the project may suffer from being artificially rushed through the system in order to meet an outside agenda.

Several people also acknowledged that another effect of chronic cost overruns is that the decision-making process itself can be compromised. This refers especially to the problem of approving projects for funding based on the cost estimate presented at the time of approval, and then discovering that the actual cost of construction is much higher than what was approved. Obviously, the process might have had a different outcome in these situations if the real costs were known at the time the project was approved for funding. Several respondents acknowledged that there are actual projects that might never have been approved if the real costs had been known at the time that funds were approved.

While some of the effects of a poor track record on cost and schedule estimating might be similar for any large public works projects, some of the particular fallout identified by respondents is unique to the transportation industry. This includes the difficulty that the transportation industry faces in trying to compete for funding in the state. The major "pots" of public funds in California generally fall into a few major categories: prisons, education, healthcare, and transportation. Transportation may arguably be perceived as having the worst reputation for cost overruns and schedule slippages among the four categories. As such, we have difficulty competing effectively for funding. At least one respondent mentioned that the performance of projects delivered under the Proposition 1B bond measure will be heavily scrutinized and—if delivered on time and on budget—may have the potential to help shift public perceptions of accountability in transportation project delivery. The hope was expressed that this could potentially help the transportation industry compete more effectively for state funds in the future.

The transportation industry's history of chronic cost overruns and schedule slippage also means that it is increasingly difficult to fund large projects. Funding entities are reluctant to allocate huge sums to projects without having some assurance that the cost estimates are accurate

and that the project sponsors will not come back multiple times for additional funds. Because all funding has some sensitivity to cash flow and timing, the cost—and other impacts—of delay was mentioned in almost every interview.

An interesting observation made by more than one respondent was that within the state of California, some members of the public who may have a general distrust of the government or, specifically, of the transportation industry, seem to have a more sophisticated view of the TAs. It was noted that there is some differentiation between various agencies in the eyes of the public, and that some of the TAs enjoy more positive reputations than other agencies in the state. It should be noted that these comments did not come solely from TA staff. One respondent noted a possible reason for this difference in public perception: TAs have a different kind of accountability for their projects since they are often both the project sponsor and a funding source.

In summary, this question elicited a broad range of specific examples of consequences and effects of chronic cost overruns and schedule slippage, but the overarching theme cited by all respondents was that it hurts the industry. It hurts our credibility and our ability to compete for funding, it reduces the purchasing power of the funding we have and makes it harder to "sell" projects. Finally, it makes it harder to increase funding or create new funding sources even though Californians consistently name transportation as one of their top concerns.

Question Two

What information do decision-makers need in order to make good decisions about what projects should be approved for funding?

Not surprisingly, nearly all respondents identified project cost estimates and schedules as key pieces of information necessary for good decision-making. Many respondents pointed out specifically that these need to be *reliable* cost estimates and schedules. One respondent summed it up effectively by stating that all key project data must be *accurate, reliable, credible* and *consistent*. This would apply to the project cost, scope, schedule and benefit/cost analysis. *Accurate* means it should be prepared by qualified individuals and checked thoroughly for technical correctness; *reliable* means that the data presented at the time of project approval should hold through construction; *credible* means that the data should be prepared according to industry standards and make sense from a technical perspective; and *consistent* means that project data for all projects should be prepared in a similar, standard manner so that decision-makers are able to make comparisons between projects. This last criteria is perhaps the most difficult to implement, but it is easy to see why decision-makers would desire it. Because they are not personally involved in specific projects and do not have an extended time in which to familiarize themselves with the details of the projects that are presented to them, decision-makers seem to experience ongoing frustration with the variable methodologies for presenting project data.

Several respondents agreed that in order to be reliable, cost estimates should be probabilistic in nature, rather than be a single fixed number. This, as discussed previously, is the model adopted by the state of Washington, as well as by other jurisdictions that have overhauled their transportation (and non-transportation) decision-making processes to improve accountability.

Several respondents also cited the need for decision-makers to be presented with a clear

scope of work. In at least one interview in which project scope was identified as a key to decision-making, it was suggested that the scope should include not only clear project limits, but also a prioritized list of what to eliminate first if the project begins to encounter cost overruns. It was also suggested that project sponsors should provide some evidence that there is consensus among stakeholders regarding both the project's scope and its budget. While it was acknowledged that there might be more than one way to accomplish this, there was general agreement that the cost estimate, scope and schedule of a proposed project needs to provide a higher degree of certainty for decision-makers than what has historically been prepared.

Several respondents also identified the need for decision-makers to have a clear understanding of the proposed benefit of the project. A sidebar from several interviewees specifically addressed the issue of the State's current tool for evaluating the benefit/cost ratio of highway projects. The "Cal B/C Model," as it is known, is believed to be a fairly blunt instrument by many of those familiar with its criteria because it does not allow for much detail in evaluating a project's merit with respect to its proposed benefit and cost. Nonetheless, it is still seen as "better–than-nothing" by those who are familiar with it. There does appear to be wide support, however—especially among decision-makers—for an improved Benefit/cost analysis tool. It was suggested by more than one respondent that a truly effective tool would provide some clear measure of how a proposed project was improving the total mobility in the state.

In considering the benefit provided by a proposed project, extensive use is made of traffic and growth forecasts. While we will never be able to "see" the future, such models are the best tools we have to help us predict the need for and value of specific transportation projects. However, one respondent mentioned two specific data points that are never included in traffic models as being helpful in realistically forecasting the benefit of a proposed project. They are the cost of homes in the region and the quality of the local schools. The respondent who brought this up discussed how these two factors have a correlation to transportation mode choice. If we incorporated this data into the models we use, it was suggested, we might be better able to identify where to make transportation investments.

Many respondents also identified the need for a realistic discussion of the risks and unknowns for a project. Everyone who mentioned this brought up the role of unknown and uncontrollable elements on projects. The most common suggestion for dealing with this was to request a good discussion of these factors and to ensure that an allowance or contingency for these items was included in the funding plan. This would include potential environmental issues within the project and possible political opposition, among other things. Again, those who cited the benefit of using a probabilistic cost estimate in the first place, i.e., providing a likely range of costs, pointed out that this approach deals with contingencies in a different—and, arguably, more specific—way. However the project sponsor achieves it, most respondents agreed that a cost estimate must include an understanding of the project's most likely risks.

At least one respondent articulated that it would be helpful for project sponsors and decision-makers to have a shared vision for what our transportation system should look like. Specifically, it was suggested that that we should adopt a statewide transportation plan to provide guidance in evaluating how well a proposed project would fit with the "transportation vision" in the state. The comment was made that the various regional and interregional plans do not necessarily constitute an integrated vision, partly because of the need to be financially constrained. That requirement means that the state is always trying to "catch up" with transportation needs, and was compared with the "spend ahead" philosophy under Governor Pat

Brown.

It was also suggested that project sponsors should provide a verified funding plan for the project if it will be receiving funds from more than one source. It was pointed out that there is sometimes a tendency to show a project getting funding from sources that have not yet been secured, often in an effort to persuade funding agencies that the project is fully funded with only a "gap" that needs to be filled. Just as cost estimates are not being useful unless they are accurate, a project's funding plan must be verifiable in order for it to be useful in decision-making.

Having a clear understanding of likely project escalation costs was cited by more than one respondent as important information for decision-makers. While construction costs have been escalating at high and hard-to-predict rates in the last few years, it is felt that project sponsors need to make an effort to show how a delay or an unusually long project duration will affect the ultimate cost of the project.

Finally, one respondent stated how important it is to look at the stated purpose of the project in question. The point was made that the reason to build transportation projects is to solve some identified transportation problem. As such, project sponsors need to present the project purpose in a clear and open way when applying for funding. It is not uncommon to see the traffic situation in a project area change over the course of a ten- or twelve-year project development process. Because of this, it is important to go back to the basic purpose of the project when evaluating it, and consider whether the project will actually solve the problem or whether "constructing the project" has become the de facto purpose. This tied into the suggestion that decision-makers need to keep in mind the question of how each project actually contributes to improving mobility in the state.

In summary, all respondents identified the need for accurate and reliable cost, schedule and scope information in order to make funding decisions on projects. Most also agreed that a clear understanding of the project's benefits and risks is important in the decision-making process. Additionally, some respondents suggested that understanding a project's purpose is important, as well as having a shared vision—possibly in the form of a formal statewide transportation plan—of what the state's transportation system should look like.

Question Three

Do you feel that decision-makers get the information they need?

Most respondents felt that decision-makers do not get exactly the information they need. Specifically, although project sponsors always provide a project's proposed cost, scope, and schedule, the information may not be accurate or reliable. Some of the respondents also suggested that it can be difficult for decision-makers to make sense of the information they do receive. This was attributed partly to a lack of consistency in the way information is presented, as well as to the occasional failure to understand the factors that influence project scope, schedule, and budget.

As a corollary to the statement that the relevant information is not always provided, more than one respondent mentioned that there are often "hidden costs" that are not identified or otherwise evident to decision-makers. Some of the hidden costs mentioned include support costs, especially Caltrans support on locally sponsored projects, which has historically been difficult to track and accurately plan for. Several respondents mentioned that Caltrans has a particularly

difficult time effectively capturing the real cost of delivering its own projects as well.

Another interesting observation made by at least one respondent was that when there is considerable political pressure to move a project forward, there may not actually be much concern with the details to support the decision. In other words, there are times when the decision is almost a foregone conclusion and the specific project information plays little part in the decision-making process. In situations where the decision is governed by politics or other behind-the-scenes activities, there may be little likelihood that a project will be turned down for funding. In such cases, the project's fate is not hinging on the facts that are presented about the project, but on other concerns. It may be that the details of the project benefit or scope were given consideration in the process, but not necessarily.

One respondent observed that decision-makers may be better equipped to make good decisions when they are somewhat familiar with the projects in question. It was suggested that one method for helping decision-makers, especially the CTC, become better acquainted with the projects that are seeking funds would be to always work from the same project list. This was another argument for a statewide transportation plan. This suggestion also illustrated an impression that decision-makers may not have time to glean sufficient information about a project if they learn about it only a week or two before the funding decision must be made

Another point illustrating the general sense that decision-makers do not always have information supporting good decision-making is the unique situation faced when the programming entity is also a project sponsor. This can occur particularly in the case of county TAs, when a city is sponsoring a project and has a project champion in a key decision-making role on the board. This is another example—not of a lack of the right information, but—of facts playing a secondary role in the decision-making process.

The most positive comment received in answer to Question Three was, "The longer you're at it, the better you get at asking the right questions." This suggests that even in the absence of specific information, an effective decision-maker can uncover sufficient project details to be able to make good decisions.

In summary, most respondents did not have great faith in the information provided to decision-makers—as made evident in the responses to Question Two—but they voiced confidence in the decisions that get made. This seems to reflect on the desire for better information without giving a no-confidence vote to the existing system. There was a strong sense that decision-makers generally do well, considering the quality and accuracy of the information provided to them and the short time-frames in which decisions must sometimes be made.

Question Four

What factors do you feel affect our ability to keep our project delivery promises?

A key factor that was identified in causing cost overruns was escalation in the cost of construction materials. Several respondents identified the volatility of prices on concrete, asphalt, and steel as having been specific factors in recent unplanned project cost increases. More than one respondent also suggested that the cost estimates developed for project programming purposes tend to be overly optimistic or even intentionally misleading. A historical lack of accountability was cited as part of the cause, since it was observed that there has rarely been any consequence for going over budget on a project. Typically, when overruns have occurred, project sponsors simply go back to the funding source and request supplemental funds. In some

circumstances it is necessary to find additional funding from other sources to cover cost overruns, but transportation projects are rarely, if ever, cancelled due to this. One respondent noted that there is little institutional support or incentive to meet a project's stated budget, scope or schedule.

One of the most commonly identified factors that particularly affects project schedules is securing various approvals from outside agencies. One respondent characterized it as follows: "There are many people along the way who can say 'no' to a project, but there is no one person who has the power to say 'yes'." While the Caltrans review process was identified by more than one respondent as a sometimes difficult to schedule and/or control element of the project development process, even projects prepared by the state must undergo extensive reviews by external regulatory agencies—local, state, and federal. It was noted that any approval by an entity that has something other than transportation project delivery as its primary mission can prove to be difficult to schedule or control, and thus has the potential to delay the schedule and increase the cost. Compounding the problem is California's relatively strict environmental regulatory climate, as well as chronic understaffing at the regulatory agencies. The understaffing problem is particularly noticeable at the federal agencies which must approve transportation projects. This includes the U.S. Army Corps of Engineers, the U.S. Environmental Protection Agency, and the U.S. Fish and Wildlife Service. At least one respondent suggested that transportation agencies might consider paying for supplemental staff to these agencies as a way to expedite projects and ultimately lower the total costs of project delivery.

In addition to various permits and approvals that must be granted along the way, there are also policy decisions made outside the sponsoring or lead agency. Much of this authority rests with Caltrans, although the Federal Highway Administration also makes decisions regarding modifications to the federal highway system. Several respondents mentioned that few individuals within any Caltrans Project Development Team (a specific group of individuals assigned to assist with or review every project that affects a highway in the state) seem to be empowered to make decisions. It is true that most of the people who have day-to-day involvement on a project do not have authority within the Caltrans hierarchy to render decisions on the project. As such—it was noted—decisions about project details can lag and require multiple meetings extending over time. Several respondents expressed frustration at this process, as well as a desire for more direct empowerment among Caltrans staff.

It is worth noting that, in the recently completed rapid repair of the "McArthur Maze," one of the actions that Caltrans took was to empower specific staff to make decisions on the spot, rather than going through the more typical hierarchical process. This would suggest that the Caltrans director is aware of the effect that the standard decision-making process can have on project schedules. Ongoing discussions of this issue continue, both within Caltrans and within other policymaking arms of the state government. One feature of the hierarchy being examined is the "stove-pipe" problem—a reference to decision-making being a "vertical" process (i.e. each decision is contained within a specific discipline), as opposed to being more cross-disciplined and oriented to problem-solving.

The process of right-of-way acquisition and transfer can also delay project delivery or closeout, a fact identified by several respondents—although it was suggested by at least one respondent that original project schedules always seem to be overly optimistic about project costs and the right of way process in particular. At least one respondent suggested that we fall short of what we promise because of a tendency to promise too much. Specifically, engineers

and other transportation professionals genuinely want to deliver good projects and because of that, we are inclined to paint a picture that proves to be unrealistic over time.

Several respondents seemed to feel that at least some of the time, the presentation of inaccurate budgets and schedules was deliberate. Again, the point was made that since there is rarely any consequence for being incorrect, there was really no reason to strive for accuracy. It was acknowledged that in some cases project sponsors might see it as beneficial to a project to underestimate costs or misrepresent the schedule because it could make the project seem like a better investment or make its benefit/cost ratio more competitive. It was also suggested that underestimating costs during the initial project phases may be seen as helping to "get a head of steam going" on the project. The discussions on this theme were interesting because they were not specific citations of causes for cost overruns or schedule slippage, but were instead fairly frank acknowledgements of Flyvbjerg's "strategic misrepresentation" concept at work in our system.

While considering factors in increasing costs, expanding scope, and extending project schedules, at least one respondent mentioned the inherent complexity of large transportation projects with their corresponding tendency to experience turbulence or "entropy." There is a sense that, while it pays to consider specific project risks, there is also a limit to the effectiveness of trying to predict precisely what will go wrong with a project. It was suggested that it is probably more effective to identify the highest risk areas of the project development/delivery process and to add some time and money to allow for those things than to spend too much effort trying to predict exactly what might go wrong along the way.

The role of politics came up in responses to this question, as it did in several others. Specifically, it was acknowledged that political forces have the power to substantially change the direction of individual projects. It was also noted that politicians are rarely held accountable for their influence on transportation projects. There was some disagreement on this point, however, as at least one respondent pointed out that citizens can effectively issue a referendum on a candidate who promised to get a project built and did not deliver—whether the politician was directly responsible for the outcome or not. Among respondents who felt that politicians had no accountability for their project-related actions, however, there was a sense that project approvals are sometimes politically motivated, rather than merit-based. In that vein, it was suggested that it might be unfair to hold the engineers or project sponsors completely responsible for the project's scope, cost or schedule.

In addition to politics and the elements of the project development process that are out of the control of the project sponsors and design team, more than one respondent identified the urge to "gold plate" projects (to deliver more than is necessary to meet the project need) as a factor in failing to meet cost and schedule commitments. This is sometimes referred to as "scope creep," although scope creep does not only apply to adding unnecessary work to a project—it can also refer to a necessary increase in effort due to unforeseen circumstances. Nonetheless, scope creep—whether merited or not—was identified as a key factor in increased costs and project delays.

Several respondents pointed out the connection between a lag in the project schedule and an increase in costs. Because construction costs have been escalating so rapidly in California over the last few years, there is a clear understanding that "time is money." Many respondents noted that every month a project is delayed adds measurably to its final cost.

One interesting idea suggested by several respondents was that because project sponsors and project management teams do not consider the funding to be “their money,” there is no personal commitment to being accountable for changes along the way. One light-hearted suggestion was to photograph key project staff with the original project schedule as a way of holding them accountable. Another way this was expressed was the suggestion that if Project Development Teams (PDTs) acted more like owner-operators, the level of commitment might be different. There is a widespread feeling that PDT members don’t see themselves as having control over most of what happens on a project, and so there is little motivation to problem-solve or ask what can be done to meet commitments. At least one respondent made reference to Caltrans in recent decades as having a “culture of obstructionism” that can affect the personal commitment of individuals. Others mentioned the adage that Caltrans’ recent historic perspective on project delivery has been “it costs what it costs, and it takes as long as it takes.” It was noted that this is more than a failure to meet commitments; it is a rejection of the very notion of accountability.

A common perception about smaller or less experienced jurisdictions that are not in the habit of regularly delivering transportation projects is that they don't have the experience and/or relationships to move a project through a relatively complex process. Thus they become bogged down or overwhelmed along the way and simply fail to deliver. Several respondents mentioned the challenge the transportation industry will collectively face as we attempt to deliver the many transportation projects that will be funded in the next few years. This is seen as a resource and staffing challenge to everyone—local, state, and federal agencies, as well as the private sector and the jurisdictions that are in need of the projects.

Some respondents suggested that part of what makes it hard to meet cost, scope, and schedule commitments is that such commitments are made too early in the process. For example, it was suggested that because of volatile construction costs, estimates should not be considered firm until at least the 65 percent design phase—a far cry from the preliminary engineering or environmental approval phases that are often the baseline. A related comment was that a lack of community consensus on what the project should be contributes to project sponsors’ inability to meet commitments. Specifically, it was asserted that without agreement on the details of the project, preparing a reliable cost estimate or schedule is impossible. One respondent suggested that a way to address this would be to have the PSR, the project initiation document that is used to secure funding for a project, signed by all key stakeholders. This would signify that there is real buy-in on the project scope and might help improve the likelihood that the project that is ultimately constructed is the same project that was initially approved and funded. It would also provide a basis for a cost estimate and project schedule.

Finally, the lack of reliable and dependable funding streams was cited as contributing to difficulties in meeting project commitments. In particular, the fact that the state gas tax has not been raised since 1994—meaning that its purchasing power has been greatly diminished over time—was identified as making project delivery more difficult in a global sense. More than one respondent identified the vulnerability of the state’s transportation resources as a problem. Several mentioned that even with the passage of Proposition 1A (which strengthened the “firewall” established by Proposition 42 to protect gasoline sales tax revenues so that they are used for transportation purposes), too much transportation funding is susceptible to political maneuvering and legislative statute.

In summary, a multitude of factors that impede our ability to deliver on our project

delivery promises were identified. They can be broken into several major categories: construction cost volatility, bureaucratic challenges, cultural challenges, lack of agreement on project scope, and the vulnerability of funding.

Question Five

Given the uncertainties inherent in the project development process, is there some project development phase at which you think it is reasonable to make a commitment to a cost and schedule for which the project is then held accountable?

a) If so, when?

b) How would that accountability be implemented?

c) If no, why not?

Virtually every respondent felt that there is a point at which project sponsors or engineers can commit to a cost and schedule, although thoughts varied considerably on what that point is. Most respondents believed that being held to the cost and schedule estimates developed for the PSR was unrealistic—because there are still so many uncontrollable variables at that phase. On the other hand, some respondents thought that the earlier a realistic cost and schedule is developed for a project, the better. These respondents were interested in developing strategies to enable early estimates to accurately account for the ultimate cost—the use of probabilistic cost ranges was one suggestion for achieving this.

For those respondents who identified a specific phase of project development at which the cost and schedule could be committed to, many felt that the 65 percent design phase was the appropriate time because the project would have received environmental clearance and most of the technical challenges would have already surfaced in the design process—giving a high level of confidence to the estimates. More than one respondent suggested using the thirty-five percent design cost and schedule estimate as the baseline. Those who proposed this also acknowledged that a considerable effort would have to be made to understand the risks facing the project in order to prepare a reliable estimate at the 35 percent design phase. These respondents voiced an understanding that the level of effort regarding risk assessment would have to be greater than is currently typical. One respondent noted that the earlier a true baseline estimate is required, the more rigorous the risk assessment process will become. Finally, more than one respondent suggested the PSR as the phase in which a project should commit to a cost and schedule, and that for this to succeed, the PSR could take on some of the elements that are currently performed in the Project Approval/Environmental Document (PA/ED) phase of project development. This idea also assumed that more effort would have to be made to identify project risks earlier on, thus resulting in the ability to effectively quantify probable project costs.

Some respondents were conflicted about identifying a particular phase for a baseline because they acknowledged that a cost and schedule is needed early on for programming purposes, but they know that early estimates tend to be inherently unreliable. Among this group, there was almost an even split between those who addressed this dilemma by suggesting that early estimates be built up with contingencies so that the project sponsors could be held accountable for them, and those who simply said there is no way to hold people accountable for the estimate until the project is bid, or—in some cases—even built. One respondent also suggested using a multi-modal analysis to help define the project before it gets programmed—again assuming that the more clearly a project is scoped at the outset, the better the chances of

accurately being able to determine a likely cost and schedule to it.

In response to *part b*, the question of how to implement such accountability, several respondents suggested publishing the cost and schedule—perhaps in some highly visible or public manner—and using the public record to help hold the project leadership to the published figures. This would establish a clear expectation and understanding from the start that project sponsors and engineers would be held accountable for whatever they said regarding the project cost and schedule. At least one respondent suggested requiring the final cost to be within 20 percent of the original estimate or the project would face consequences. Possible consequences are discussed later in this section.

As was mentioned in the responses to *part a*, one suggestion for implementing greater accountability for cost estimates was to use range-based cost estimates rather than to just give a number. A probabilistic range of costs would be provided during the early phases of the project, and as the project advanced and its specific risks were better understood at each phase, the range would be narrowed or refined, until it could be expressed as a narrow range with a high likelihood of occurrence. It should be noted that there was no suggestion to move from a range to a single number prior to construction, but simply that the range be refined as the project progressed through environmental approval and design.

One other idea proposed to specifically help enforce the baseline cost was that the sponsoring agency be made responsible for raising funds to cover any overruns. This was proposed by several respondents, although it is worth noting that it was also discussed and rejected by several respondents. Those who rejected it did so because they felt that it did not actually support the level of accountability they wanted. Several of these respondents pointed out that while this approach would put the project sponsor "on the hook" for finding the additional funds, it did not address the fact that the additional cost would cause a corresponding reduction to the project's benefit/cost ratio by increasing the cost without necessarily increasing the benefit. Accordingly, those who rejected this approach felt that it failed to hold project sponsors accountable for the decision-making process itself. At least one respondent mentioned that such budget changes undermine the validity of choosing to fund one project over another. On the other hand, those who advocated making the local agency responsible for cost overruns pointed out that it could be an effective deterrent for agencies that have a limited budget because overruns on one project would result in a deficit for the sponsor's other projects. The thought was that it would encourage a more rigorous approach to cost estimating to ensure that the agency would actually be able to deliver everything it promised.

One respondent advocates the complete cancellation of all funding if a project has a significant cost overrun and/or schedule slip. It was acknowledged that unless project sponsors *believe* there are consequences, any efforts to improve accountability will remain ineffective. More than one respondent noted that it is likely that the CMIA program under Proposition 1B will be the first program in California's recent history to demonstrate a firm level of enforcement on cost and schedule commitments. Several respondents discussed the fact that while many projects face considerable political pressure to move ahead—regardless of cost or schedule problems—any project in the CMIA program that has a serious cost overrun or schedule slippage could be subject to removal from the program. It is considered more likely to happen in the CMIA program than in the STIP because of the Governor's executive order on accountability and the fact that each project's benefit/cost ratio was considered in the selection process. As mentioned earlier, a major cost increase without a corresponding increase in the project benefit

reduces its benefit/cost ratio. It follows that if a project were selected based on the quantified benefit it promised to provide relative to its cost, then a change to the cost could be seen as invalidating the selection criteria after the fact. This is the driver for some respondents opinions that projects with substantial cost overruns should be removed from the program altogether.

Another suggestion of consequences for failing to deliver a project on time or on budget was to restrict the sponsoring agency from submitting additional projects for consideration in the Interregional Transportation Improvement Program (ITIP) until it has successfully delivered the project in question. Comparing how public projects get evaluated for continued funding versus how projects get evaluated in the private or manufacturing sector, another respondent noted that public projects are rarely, if ever, removed from the project development process once that process has been initiated. It was suggested by more than one respondent that a real "go/no-go" evaluation be performed at each of the funding phases with a willingness to cancel the project if it begins to appear that the return on investment is not likely to meet expectations. One respondent noted that the transportation industry might be able to make better use of our limited funds if we had a way to cut our losses when it becomes apparent that a project can not deliver the promised benefit within an agreed upon budget and schedule.

As a corollary to frequently reevaluating the benefits of a project relative to its cost, it was also suggested that more effort be made to have decision-makers with a personal stake in a project recuse themselves from the process. This may be more relevant in the case of county TAs, where the board consists of elected officials from cities and towns within the county. It is a frequent occurrence that TAs vote on projects that fall within specific jurisdictions, however, and there could be circumstances in which a blanket rule of recusal could prove challenging. It would be interesting to propose such an approach however, and make recusal a common practice with room for exceptions.

Another approach suggested for enforcing both cost estimates and schedules was to use pricing—both for estimating purposes and for construction bidding—based on a "put-in-place" cost per item, rather than on a unit-price cost, which typically allows contractors more room for negotiation on the final cost to construct. A put-in-place cost means that the contractor promises to construct that element for the quoted price—regardless of what that entails. This acts similarly to a guaranteed price for that work, because it puts the risk for most of the unexpected field conditions and other typical time-delaying elements of construction on the contractor. Owners could expect to potentially pay more for the work since they are shifting some of the project risk to the contractor, but this could in turn lead to better up-front analysis of risks on the part of the designers and therefore a total reduction in both unplanned-for risks and project costs.

Even among those respondents who advocated using one number rather than a range, there was an acknowledgement that there are sometimes good reasons that a project's cost might have to be adjusted. It was suggested by more than one respondent that there be a way to adjust the numbers when necessary and with proper justification. A follow-up question might be to ask if using a cost *range* from the start might be an appropriate way to effectively allow for well-justified adjustments, while still holding the project accountable.

Another suggestion for holding projects accountable for cost and schedule was to introduce a competitive element. Essentially, there would be an evaluation after a project is completed and the accuracy of the baseline cost and schedule estimates would be reported. The next time that that project sponsor or lead agency proposed a project, previous data on their

accuracy would be considered in the decision about whether to fund it.

With all the discussion of consequences for failure, only one respondent suggested that there should be some reward for delivering a project under budget and on schedule. It may be a commentary on how entrenched we are as an industry that it is difficult for most people to even imagine that we would be able to change the long-standing habit of cost overruns and schedule extensions. Nonetheless, it does seem reasonable that there should be some positive incentive for successfully meeting cost and schedule commitments. No specific suggestions were provided, however, except as mentioned above: successful project sponsors would have a higher likelihood of receiving funding for the next project.

The one respondent who wasn't sure if it was reasonable to commit to a project cost and schedule voiced the concern that it is difficult to fully understand a project's risks prior to completing the environmental clearance and approval process. This respondent was strongly in favor of holding project sponsors accountable for their projects in some way, but was also acutely aware of the difficulties in accurately predicting costs and schedule. It might have been interesting to discuss the idea of probabilistic estimating and some of the other concepts suggested by others, but that was beyond the scope and intent of the interview.

In summary, most respondents felt that it was reasonable to commit to a project cost and schedule at some point in the project development process. Additionally, virtually all respondents conveyed a clear understanding of the connection between project risks and the ability to commit to a cost and schedule. Opinions varied regarding how to address this issue, with some respondents supporting early efforts to quantify and evaluate risk, and others recommending allowing projects to go further in the project development process before committing to a baseline cost and schedule. There was widespread agreement that commitments, regardless of when in the process they were made, should be enforced—although opinions varied regarding implementation of this enforcement. Possible approaches to enforcement included assigning responsibility for any cost overruns to the lead or sponsoring agency, rescinding funding approval for projects that fail to meet their commitments, and systematically collecting data regarding agencies' and individuals' track records for project delivery to be used in future decision-making. Possible rewards for success were only briefly mentioned.

Question Six

Do you think we need to make fundamental changes to our approach to project programming to achieve greater accountability, or are there incremental changes we could make to our current system that would make a difference?

In their answers to the previous question—as well as to Question Two—many respondents suggested changes to the existing system that represent a significant departure from the funding decision-making process as we know it today. Nonetheless, when asked Question Six directly, a significant number of them said that they believed that incremental changes would be effective. Some respondents who gave this answer, though, added the caveat that incremental changes are more likely to be implemented and are, therefore, a better approach. Others simply stated that they thought incremental changes would be best.

On the other hand, about half of respondents stated that the system should be radically changed. Several of these respondents said something akin to "make incremental changes along the way, but seize the chance to make fundamental change when the opportunity presents itself."

It was clear in talking to these respondents that many of them believe that the passage of Proposition 1B might bring with it an opportunity for fundamental changes to be made to the system. Additionally, many of them—across the industry—are engaged in various dialogs about how some of those changes might be implemented. Some of them are looking for opportunities to help bring reform in the near term, but there was also a widespread understanding that it is difficult to change bureaucracies, especially those that have evolved over time and that are subject to political pressure.

The most commonly–identified fundamental change that many respondents specifically want to see implemented is to incorporate a better understanding of project risks into budget estimates. This does indeed mark a change from the way that projects have been estimated in the past, but there are beginning to be some tools and expertise available to do just that. Respondents also want to bring more transparency to the system. The repair of the MacArthur Maze was used as an example: every step of that process was done in the open, with press coverage and public scrutiny. As a result, Caltrans streamlined its decision-making processes and—with the help of a contractor who was prepared to be accountable—delivered the project in record time. A recommendation was also made to require project delivery "contracts" to be signed as a record of the commitment of the entire project team. However, the explicit point was added that such contracts are only valid when they are signed by the *right* people—those who are responsible for scoping, designing, and managing the project.

More than one respondent also identified some of the transportation legislation that has been passed in the last decade or so as examples of fundamental changes that have been followed by successive incremental changes. SB 45 and the Traffic Congestion Relief Program (TCRP) were two specific examples of this. As was suggested in Question Five, *part b*, one of the fundamental changes proposed by more than one respondent was the idea of performing a "go/no-go" evaluation at each project phase. It was also recommended to adopt an approach to transportation projects that would focus on corridor-based solutions, rather than on individual projects. This would open up a broader selection of options for solving the problems faced within specific corridors if all modes and a full range of solutions could be considered. In order for this to be most successful, there should be an accompanying movement to provide greater flexibility in how specific funding can be spent.

It was also mentioned, as an example of incremental changes that are already being implemented, that some programs do have penalties for projects that experience significant schedule slippage. For example, the STIP includes requirements for timely use of funds, with a limit of a single time extension request, intended only for use in extenuating circumstances. Also, the requirement for the CMIA projects to calculate their benefit/cost ratio as part of the evaluation process is an incremental change that has now been implemented in at least one program, with more to come as other Proposition 1B programs move forward.

In summary, respondents were split almost evenly in their direct responses about whether change should be fundamental or incremental. Interestingly, many of those who answered this question in favor of incremental change had presented opinions in some of their other answers that might have suggested they would recommend fundamental change. This may be partly due to some skepticism regarding the ability of political bureaucracies to make fundamental changes. Regardless of exactly how each respondent replied, in the aggregate it is clear that people who have worked for a long time within the system may or may not believe that an overhaul is needed—but they are all prepared to work incrementally to implement change where they can.

CONCLUSION

Accountability in transportation infrastructure project delivery is not a foregone conclusion. Many factors, both technical and institutional, can conspire to make accountability—and even predictability—an elusive goal. Nonetheless, in the U.S. and around the world, scholars and transportation decision-makers are looking for ways to increase the transportation industry's ability to accurately estimate projects costs and hold to other project commitments. This question has never been more important for California than it is today.

Thanks to recent research on scheduling and cost estimating tools and procedures, as well as risk management and other related topics, California's transportation leaders can learn from the work of others. There is a growing number of people around the world who are taking an interest in bringing more accountability to transportation project delivery. In this era of limited funding and persistent distrust of government, greater accountability is an essential ingredient in delivering the projects that have the potential to improve mobility for our society.

Incentives for establishing overly optimistic project budgets and schedules have traditionally been very high, while incentives to be realistic have been low. In the past, the reward for optimism (or even misrepresentation) was getting a project approved and/or funded. There has been a high level of awareness in the industry, from both project sponsors and decision-makers, that cost and schedule estimates developed in early project phases were rarely accurate, but there has also been a tacit understanding that the remedy for this was to simply go back to the funding entity and request additional funds. Historically there have been few disincentives—the project sponsor would identify the reasons for the increase or the delay, and the additional funds would be approved.

Linked to the easy acceptance of cost overruns and schedule delays was also a widespread perception that it did not pay to be too "realistic." A project that took a more realistic approach might not compete well with projects that took the "optimistic" approach. With few, if any, negative consequences for having to ask for more money later, the system itself was not set up to actively encourage realistic estimates and schedules.

Today the overall landscape has shifted. California's transportation system is showing its age and in many cases is operating at or beyond capacity; our gas taxes, which are not indexed to inflation, have less buying power than ever since they have not been increased for fifteen years; and we as a society are reluctant to impose taxes on ourselves, even for desirable projects or services. It has never been more important to spend our transportation dollars wisely. We need a system for funding transportation projects that supports and rewards a higher level of accountability. As this report demonstrates, many within the industry are already envisioning how to bring this about.

One thing the California transportation industry has learned in the last twenty years is that there is a real link between funding and accountability. Whether the funds are from public or private sources, we must be accountable. The respondents who participated in this study—people who are project sponsors and decision-makers—are in agreement that we are poised to make a paradigm shift; indeed, it is already happening. This is an exciting and historic time to be a part of California's transportation industry. Together we will develop a culture of accountability and continue to improve mobility in the state.

APPENDIX A—REQUEST FOR PARTICIPATION TEMPLATE

Dear

I am in the process of completing a master's degree in Transportation Management at the Mineta Transportation Institute at SJSU. My capstone project (thesis) is an exploration of accountability in transportation project delivery. As part of my research, I am interviewing people who have worked for at least 20 years in the transportation industry in California and have a good understanding of issues relating to project programming and delivery. I am interested in your perspectives on accountability and I would deeply appreciate your participation in my study, if you are willing.

I have developed a set of six interview questions that I would like you to respond to. I've attached it here, and would like to spend about 30-45 minutes—at your convenience—talking with you about them. We could do it over lunch, over the phone, or you are welcome to simply respond in writing and return it to me if that is preferable. It would be great if we could do this in the next couple of weeks.

Your answers will be confidential and will not be attributed to you, although I will provide a list of my interviewees in the final paper. Part of the value of your responses is your candor and, as such, I will keep all responses anonymous.

Please let me know whether you are willing and/or able to participate in the study so that we can set up a time to meet or otherwise talk. I can be reached on my cell phone at XXX-XXX-XXXX, or by email at XXXXXXXXXXXXXX. I am happy to answer any questions you may have. Thanks for taking the time to read this, and I look forward to the opportunity to speak with you.

Sincerely,

Andrea G. Glerum, PE

APPENDIX B—INTERVIEW QUESTIONNAIRE

Accountability in Transportation Project Delivery
Interview Questions

For the purposes of this study, accountability in transportation project delivery is defined as:

> meeting the commitments made regarding a project's scope, budget and schedule; delivering projects that provide real benefit relative to their cost.

There is considerable data demonstrating that a high percentage of transportation projects—especially those over $100 million—end up costing more to deliver than was estimated at the time the project was programmed to receive funding.

1. What effect do you think this has on the transportation industry?

2. What information do decision-makers need in order to make good decisions about what projects should be approved for funding?

3. Do you feel that decision-makers get the information they need?

4. What factors do you feel affect our ability to keep our project delivery promises?

5. Given the uncertainties inherent in the project development process, is there some project development phase at which you think it is reasonable to make a commitment to a cost and schedule for which the project is then held accountable?
    a) If so, when?
    b) How would that accountability be implemented?
    c) If no, why not?

6. Do you think we need to make fundamental changes to our approach to project programming to achieve greater accountability, or are there incremental changes we could make to our current system that would make a difference?

APPENDIX C—LIST OF INTERVIEW PARTICIPANTS

John Barna, Executive Director, California Transportation Commission

Marian Bergeson, Commissioner, California Transportation Commission

David Brewer, Chief Deputy Director, California Transportation Commission

Jim Ghielmetti, Chair, California Transportation Commission

William Gray, President, Gray-Bowen

Daryl Halls, Executive Director, Solano Transportation Authority

Paul Maxwell, Chief Deputy Executive Director, Projects, Contra Costa Transportation Authority

Robert McCleary, Executive Director, Contra Costa Transportation Authority

Christine Monsen, Executive Director, Alameda County Transportation Improvement Authority

George Nolte, President, Nolte Associates

Robert Oakes, Transportation Policy Advisor

APPENDIX D—GOVERNOR'S EXECUTIVE ORDER S-02-07

WHEREAS in the 1950s and 1960s, Californians made a phenomenal investment in the state's highways, water supply systems, schools and universities providing the infrastructure that is now the foundation of the eighth largest economy in the world; and

WHEREAS in 1950s the state's population was about 13 million, but is now approaching 38 million, and over the next two decades it will increase by another 23 percent; and

WHEREAS the infrastructure investments of a half century ago are showing their age and straining to support a vibrant economy and population much larger than they were designed to accommodate; and

WHEREAS a massive infusion of new infrastructure investment is necessary to ensure the state's high quality of life and California's position as a global economic powerhouse; and

WHEREAS on November 7, 2006 the people of California approved a $42.7 billion bond package to partially fund the first phase of an historic twenty-year California Strategic Growth Plan that is intended to build a prosperous future for our children and grandchildren; and

WHEREAS I am proposing an additional $43.3 billion of bond funding to complete the first phase of the Strategic Growth Plan; and

WHEREAS it is the obligation of state government to ensure that the foresight and commitment shown by the voters results in the high quality infrastructure future which they support; and

WHEREAS the essence of that obligation is for state government to be accountable to the people for how Strategic Growth Plan bond proceeds are spent; and

WHEREAS that accountability consists both of ensuring that bond expenditures contribute to long-lasting, meaningful improvements to critical infrastructure, and providing the public with readily accessible information about how the bonds they approved and are paying for are being spent.

NOW, THEREFORE, I ARNOLD SCHWARZENEGGER, Governor of the State of California, by the virtue of the power and authority vested in me by the Constitution and laws of the State of California, do hereby issue this Executive Order to become effective immediately:

1. All agencies, departments, boards, offices, commissions and other entities of state government (hereinafter referred to "departments") that are responsible for expending the proceeds of already authorized and future state general obligation bonds and lease revenue bonds shall be accountable for ensuring that those bond proceeds are expended in a manner consistent with the provisions of either the applicable bond act and the State General Obligation Bond Law or laws pertaining to state lease revenue bonds and all other applicable state and federal laws. In addition, departments shall be accountable for ensuring that bond proceeds are spent efficiently, effectively and in the best interests of the people of the State of California.

2. Each department shall establish and document a three part accountability structure for the Strategic Growth Plan bond proceeds.

Front-End Accountability

Each department shall follow criteria or processes that will govern the expenditure of bond funds, and the outcomes that such expenditures are intended to achieve. Such criteria and outcomes must be defined in, or derived from, one or more of the following:

- Requirements of state or federal law.

- Regulations defining the basis upon which bond proceeds are to be allocated for a program administered by the department.

- A strategic plan for implementing the mission of the department or the pertinent program funded by bond proceeds. Such a strategic plan shall have been duly adopted by the executive officer or governing body of the department and be available to the public.

- A capital outlay program that identifies departmental infrastructure needs and delineates projects or strategies for addressing those needs. Such a program shall have been duly adopted by the executive officer or governing body of the department and be available to the public.

- Performance standards or outcome measures duly adopted by the executive officer or governing body of the department and available to the public.

All projects, grants, loans or other expenditures of bond proceeds must be made consistent with these criteria and processes. In addition, each department shall prepare a list of all projects, grants, loans or other activities funded from bond proceeds that will be made available to the public.

In-Progress Accountability

Each department shall document what ongoing actions it will take to ensure that the infrastructure projects or other permissible activities funded from bond proceeds are staying within the scope and cost that were identified when the decision was made to fund the project or activity. Each department shall make semi-annual reports to the Department of Finance (Finance) of these actions to ensure that the projects and activities funded from bond proceeds are being executed in a timely fashion and achieving their intended purposes.

Follow-Up Accountability

Department expenditures of bond proceeds shall be subject to audit to determine whether the expenditures made from bond proceeds:

- Were made according to the established front-end criteria and processes.

- Were consistent with all legal requirements.

- Achieved the intended outcomes.

Departments shall contract with Finance for the performance of these audits unless alternative audit arrangements are made with the concurrence of Finance.

3. By March 1, 2007, each department shall submit its three part accountability structure as delineated in paragraph 2 above to Finance for review. Finance shall determine the reasonableness of the structure and ensure its consistency with this Executive Order. No department shall expend bond proceeds until Finance has determined that the department's plan is adequate. However, Finance may authorize a department to expend funds for up to four months prior to approval of its accountability structure in extraordinary cases for an established program for which bond proceeds are continuously appropriated by the terms of a bond measure, or when the necessity of a department's governing board meeting schedule will make the March 1 date an unattainable deadline.

4. Finance shall establish a web site to provide the public with readily accessible information on how proceeds of State general obligation bonds and lease revenue bonds are being utilized. The web site shall include:

- The three part accountability structure for each department.

- A listing of the projects, programs or other authorized activities being funded under the provisions of each general obligation bond act and a description of each project funded through State lease revenue bonds, and the amounts expended for each.

- The ongoing in-progress actions being taken to ensure that bond-funded projects and activities are remaining within scope and cost.

- The results of the completed projects, programs or other authorized activities funded from State general obligation and lease revenue bond proceeds.

Each department shall provide Finance the information necessary to support this web site in the form and time frame determined by Finance.

IT IS FURTHER ORDERED that State agencies and departments shall cooperate in the implementation of this Order. Other entities of State government not under my direct executive authority, including the California Public Utilities Commission, the University of California, the California State University, California Community Colleges, constitutional officers, and legislative and judicial branches are requested to assist in its implementation.

This Order is not intended to, and does not, create any rights or benefits, substantive or procedural, enforceable at law or in equity, against the State of California, its departments, agencies, or other entities, its officers or employees, or any other person.

I FURTHER DIRECT that as soon as hereafter possible, this Order be filed in the Office of the Secretary of State and that widespread publicity and notice be given to this Order.

IN WITNESS WHEREOF I have hereunto set my hand and caused the Great Seal of the State of California to be affixed this 24th day of January 2007.

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Arnold Schwarzenegger

ENDNOTES

[i] "California Travels: Financing our Transportation, p62. Accessed 6/8/2007 at http://www.lao.ca.gov/2007/ca_travels/ca_travels_012607.pdf

[ii] Attachment to Resolution G-05-07, STIP Guidelines, Policies and Procedures Specific to the 2006 STIP, p.4. Accessed 6/5/2007 at .http://www.mtc.ca.gov/funding/STIP/2006RTIP/CTC_2006_STIP_Guidelines.pdf, p.

[iii] "Collaborative Leadership: Success Stories in Transportation Mega Projects, Alameda Corridor Project," 2005. Accessed 2/15/2007 at http://www.fhwa.dot.gov/programadmin/mega/collaborative04.cfm.

ACRONYMS AND ABBREVIATIONS

Caltrans	California Department of Transportation
CCTA	Contra Costa Transportation Authority
CEQA	California Environmental Quality Act
CMIA	Corridor Mobility Improvement Account
CTC	California Transportation Commission
GAO	Government Accountability Office
ITIP	Interregional Transportation Improvement Program
ITSP	Interregional Transportation Strategic Plan
JLARC	Joint Legislative Audit and Review Committee
NEPA	National Environmental Protection Act
PSR	Project Study Report
RTIP	Regional Transportation Improvement Program
RTP	Regional Transportation Plan
RTPA	Regional Transportation Planning Agency
SAFETEA-LU	Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users
SANDAG	San Diego Association of Governments
SB	Senate Bill
SCCTA	Santa Clara County Traffic Authority
STIP	State Transportation Improvement Program
TA	Transportation Authority
TCRP	Traffic Congestion Relief Program

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ABOUT THE AUTHOR

Andrea Glerum spent the first thirty-two years of her relationship with transportation purely as an end user. Since 1995, she has been working in the industry. Andrea has had the privilege of working on a number of mega-projects, which has informed her interest in accountability (among other things). She has spent time working in both the private and public sectors, as a project engineer and—since 2002—a project manager. Andrea hopes to be involved in transportation policy and funding discussions in California for a long time to come. She and her partner live in the San Francisco Bay Area.