San Francisco-Oakland Bay Bridge

New East Span Project

Lessons Learned Report

Final Report - May 2014

Photo Credit: William Hall, Senior Photographer, Caltrans

Prepared for:

Malcolm Dougherty, Caltrans Director

Caltrans

CALIFORNIA DEPARTMENT OF TRANSPORTATION

State of California
DEPARTMENT OF TRANSPORTATION

California State Transportation Agency

M e m o r a n d u m

Flex your power!
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To: MALCOLM DOUGHERTY
Director

Date: May 29, 2014

From: KENNETH TERPSTRA
Toll Bridge Program East Span Project Manager

Subject: **RESPONSE TO "REQUEST FOR REPORT ON LESSONS LEARNED FROM BAY BRIDGE CONSTRUCTION"**

Per your October 4, 2013 memorandum requesting that Caltrans conduct a post-construction review of the management practices employed during construction of the East Span of the San Francisco-Oakland Bay Bridge, enclosed please find the San Francisco-Oakland Bay Bridge New East Span Project – Lessons Learned Report, dated May 2014.

Purpose Statement
The purpose of this report is to identify best practices and practices to avoid when managing state-sponsored mega-projects. This report focuses primarily on the period following the enactment of California Assembly Bill 144 (passed in July 2005) that established the Toll Bridge Program Oversight Committee (TBPOC).

Project Scope and Approach
The scope of this report is to identify and document the practices that worked and did not work on this project, and the practices to consider for managing future large construction projects.

The general basis of gathering information of lessons learned was performed by conducting more than 30 interviews of a wide cross-section of individuals directly involved in the new East Span project that included the TBPOC, Project Management Team (PMT), Caltrans Chief Deputy Director, Caltrans District 4 leadership, Toll Bridge Program leadership, Seismic Safety Peer Review Panel members, risk management team and former risk manager, subject matter expert panel members, prime contractors, Caltrans Environmental team, Caltrans Materials Engineering and Testing Services team, and other Caltrans support unit members.

The Lessons Learned Report consists of the following sections: The Governing Body, Toll Bridge Seismic Retrofit Program Organization Structure, Risk Management, Managing Expectations, Project Delivery Method, Quality Management, and Technological Sublime. This report is in the context of and addresses issues raised by the following investigations: State Auditor 2004[1], Legislative Analyst 2005[2], The Results Group 2005[3], and State Auditor 2006[4].

This report discusses issues at a high level that relate to organizational structure, management practices and processes, but does not attempt to delve into the detailed areas of design and construction issues.

[1] California State Auditor, Department of Transportation: Various Factors Increased Its Cost Estimates for Toll Bridge Retrofits, and Its Program Management Needs Improving (December 2004), <http://www.bsa.ca.gov/pdfs/reports/2004-140.pdf>.

[2] Legislative Analyst's Office, Hard Decisions Before the Legislature: Toll Bridge Seismic Retrofit (January 2005), <http://www.lao.ca.gov/2005/toll_bridge/toll_bridges_012405.htm>.

[3] The Results Group, Historical Review of San Francisco-Oakland Bay Bridge East Span Seismic Retrofit Cost Increases Final Report (January 2005), <http://www.dot.ca.gov/docs/FinalReportToBTH1-22-05.pdf>.

[4] California State Auditor, San Francisco-Oakland Bay Bridge Worker Safety: Better State Oversight Is Needed to Ensure That Injuries Are Reported Properly and That Safety Issues Are Addressed (February 2006), <http://www.bsa.ca.gov/pdfs/reports/2005-119.pdf>.

San Francisco-Oakland Bay Bridge (SFOBB)

New East Span Project – Lessons Learned Report

FINAL REPORT – MAY 2014

Prepared by:

CALIFORNIA DEPARTMENT OF TRANSPORTATION (CALTRANS)

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ACRONYMS

AB – Assembly Bill

ABF – American Bridge/Fluor

ATLSS – Advanced Technology for Large Structural Systems

BATA – Bay Area Toll Authority

BBDTF – Bay Bridge Design Task Force

BIM – Building Information Modeling

BIRIS – Bridge Inspection Records Information System

BSA – Bureau of State Audits

CCO – Contract Change Order

CFT – Cable Focus Team

CMGC – Construction Manager-General Contractor

CPT – Communications Partnership Team

CTC – California Transportation Commission

DB – Design-Build

DBB – Design-Bid-Build

DVBE – Disabled Veteran's Business Enterprises

EDAP – Engineering Design and Advisory Panel

FHWA – Federal Highway Administration

JIC – Joint Information Center

METS – Materials Engineering and Testing Services

MTC – Metropolitan Transportation Commission

OBG – Orthotropic Box Girder

PIO – Public Information Office

PMI – Project Management Institute

PMT – Project Management Team

PPP – Public-Private Partnership

QA – Quality Assurance

QA/QC – Quality Assurance / Quality Control

QC – Quality Control

SAS – Self-Anchored Suspension

SB – Senate Bill

SFOBB – San Francisco-Oakland Bay Bridge

SSPRP – Seismic Safety Peer Review Panel

SSTI – State Smart Transportation Initiative

TBPOC – Toll Bridge Program Oversight Committee

TBSRP – Toll Bridge Seismic Retrofit Program

YBI – Yerba Buena Island

YBIDT – Yerba Buena Island Detour Team

YBITS – Yerba Buena Island Transition Structures

ZPMC – Zhenhua Port Machinery Company

Table of Contents

Table of Contents (continued)

EXECUTIVE SUMMARY

On Tuesday, October 17, 1989, at 5:04 p.m. the Loma Prieta earthquake shook Northern California causing major damage to the transportation infrastructure, including the collapse of a 50-foot segment of the eastern span of the Bay Bridge. Immediately after the earthquake, Caltrans undertook the repairs to reopen and restore the transportation artery to the traveling public. At that time, the State of California was faced with the decision to retrofit the existing bridge or replace it in its entirety.

Over the next few years (1989-1997), Caltrans performed various studies to determine the best approach to maintaining the bridge and extending its useful life for the years to come. To meet the basic seismic criteria of a lifeline structure, it was determined in 1996 that a bridge replacement was more effective than a seismic retrofit project for the East Span.

Period Prior to the Implementation of the Toll Bridge Program Oversight Committee (1997-2005)

The period of 1997-2005, prior to the implementation of the Toll Bridge Program Oversight Committee (TBPOC), began well and concluded following a tumultuous period of political and world events. The collaborative approach initiated by Caltrans with the Metropolitan Transportation Commission (MTC), which began in 1997, supported selection of a bridge type and led to environmental clearance of the San Francisco-Oakland Bay Bridge (SFOBB) East Span Replacement project by mid-2001. The project then went through a turbulent period driven in part by world and political events beyond the control of the delivery team. The 9/11 terrorist attack in New York caused a period of world markets instability and drove steel material escalation trends significantly beyond predicted models, which in turn had dramatic negative impacts on insurance and bonding escalation. Regional and state political activity, principally the 2003 recall of the Governor, led to uncertainty in political leadership causing a dynamic but disruptive period of time where communication of issues was tightly controlled and decision making was deferred.

This period experienced the major cost overruns and delays for the Toll Bridge Seismic Retrofit Program (TBSRP), with the East Span being the major contributor. These impacts, and the reasons causing them, were identified by a 2004 California Bureau of State Audits (BSA) report, entitled "Department of Transportation: Various Factors Increased Its Cost Estimates for Toll Bridge Retrofits, and Its Program Management Needs Improving."

Period After the Implementation of the Toll Bridge Program Oversight Committee (2005-2013)

The period of 2005-2013 is defined by Assembly Bill 144 (see Appendix A) which established additional funding, defined a new governing body, the TBPOC, and provided a set of operating requirements, as generally outlined below:

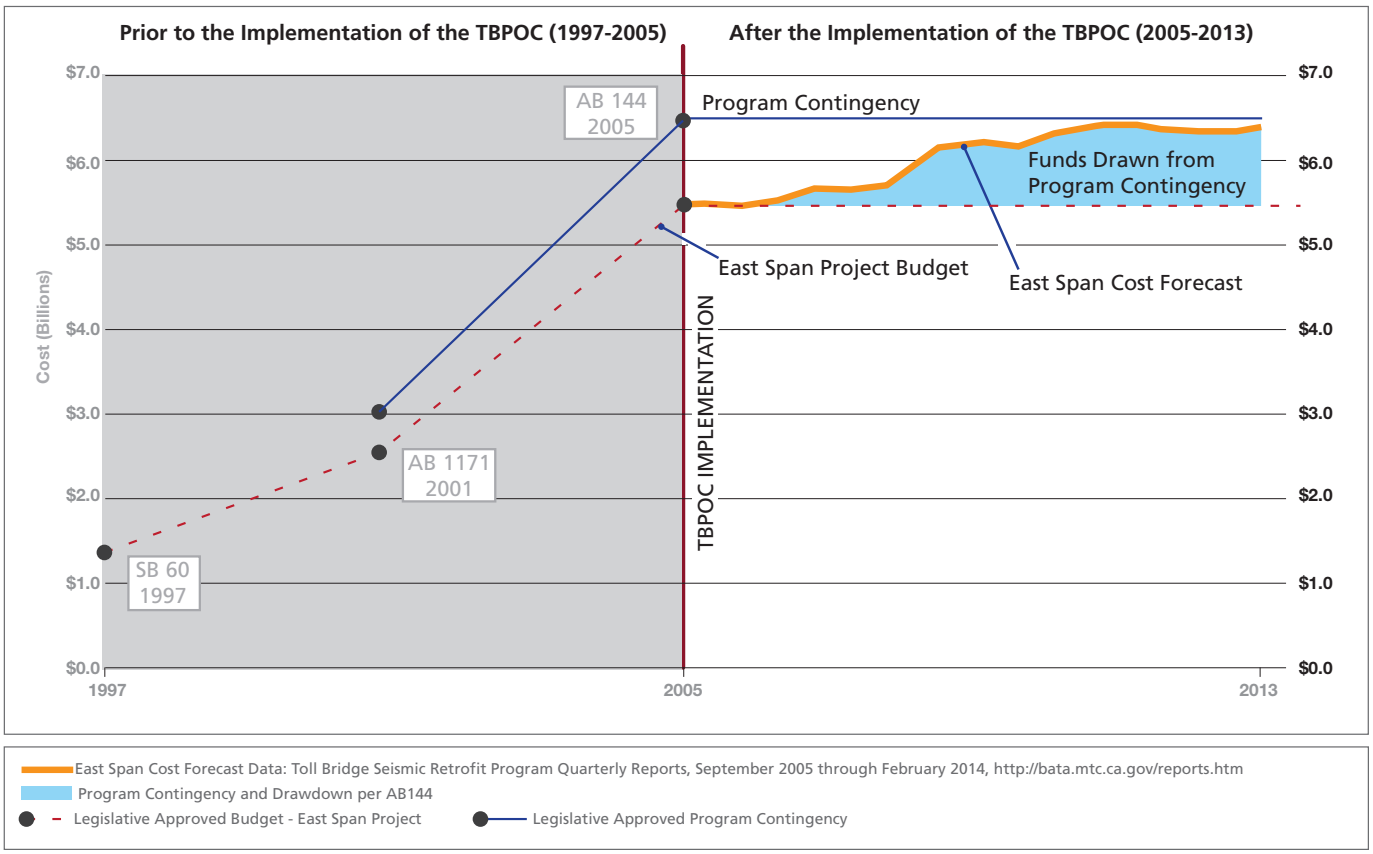
- Established the additional sources of funding to increase the East Span Project budget from $2.60 Billion (AB 1171 in 2001) to $5.49 Billion (AB 144) with a program contingency of $900 Million.
- Established the Toll Bridge Program Oversight Committee which consisted of the director of Caltrans, the executive director of the Bay Area Toll Authority (BATA), and the executive director of the California Transportation Commission (CTC) whose primary role was to implement overall project oversight and project control processes for the TBSRP projects.

- Established a comprehensive risk management plan that clearly defined roles and responsibilities for risk management and addressed the process by which it identified and quantified project risks, implemented and tracked risk response activities, and monitored and controlled risks throughout the duration of the project.
- Provided quarterly reporting of project progress and budget and schedule updates to the transportation and fiscal committees of both houses of the Legislature and CTC for the TBSRP.

Project Understanding and Cost Forecasting

The East Span project, consisting of a lifeline interstate connecting the Bay Area with the largest Self-Anchored Suspension (SAS) span ever built in a region of high seismic activity, is complex and technologically challenging. In June 1998, when the SAS span was selected, the enormity and complexity to deliver this project was not yet fully realized. This understanding evolved over time as design and construction progressed. This evolution of project understanding led to an improved comprehension of project scope and cost; ultimately leading to increased accuracy of project schedules and cost estimates. The estimates and schedules are a reflection of the project understanding from that time period and are as accurate as the information provided or understood. As demonstrated in Exhibit 1: East Span Project - Cost Forecasting History, the cost forecasting did not fall into an acceptable range of true project costs until after Assembly Bill 144 in 2005. At this point the project scope and understanding were clear because the project design was almost complete and some early construction contracts had been started. After Assembly Bill 144 the project remained within range of project budget and program contingency.

Exhibit 1: East Span Project - Cost Forecasting History



Overall Highlights of Lessons Learned

On September 2, 2013, traffic was moved from the seismically-deficient 75-year-old existing East Span to the new span designated as a lifeline structure and designed to withstand probable ground motions from the largest earthquake to occur once every 1,500 years. With other infrastructure mega-projects in the State's future, many lessons were learned from the East Span project that can be applied to other mega-projects as well as other regular infrastructure projects.

The following are some major highlights of what worked well and what did not.

What Worked

1) The TBPOC was an effective governing body concept because it enhanced accountability, oversight to program finances, and resolution of critical issues relating to cost and schedule impacts, and regular reporting to the California State Legislature for the TBSRP.

2) Three agencies joining together added credibility to a unified oversight of the TBSRP. One agency alone may bring a narrower perspective in decision making.

3) The TBSRP co-located all parties to Pier 7 in Oakland. This central location created a campus environment that fostered team work, accountability, and communication. Parties included environmental, design, construction, small business, and contractor staff. In addition to Pier 7, the program implemented co-location at the detailer's shop in Canada during the SAS contract shop-drawing phase and at the fabricator's shop in China during the SAS steel fabrication, helping to resolve issues on site in a timely manner.

4) The TBSRP leadership communicated effectively during the construction phase with various fabricators through well-timed visits, helping to build relationships and provide a greater understanding of the complexity of the fabrication and the associated quality and schedule challenges.

5) The TBSRP leadership engaged various external permitting agencies throughout the project, which positively impacted the project towards completion.

6) The TBSRP established formal and informal partnering activities with prime contractors on a regular basis that helped develop relationships for efficiently addressing challenges.

7) The TBSRP had a robust risk management program that informed major decisions on the project after 2005.

8) Multidisciplinary task forces were created to assess and resolve specific high risk project issues that were identified on the risk register.

9) The project team found innovative ways of delivering project information such as creating an online media bar, using Google Earth, and developing mobile applications to reach out to the public.

10) Caltrans engaged potential contractors through contractor outreach processes to get their input before each of the contracts went out to bid.

11) The TBSRP increased participation of small businesses through various outreaches and business-related training workshops.

12) On the East Span project the Materials Engineering and Testing Services (METS) team provided input from past bridge projects during the design process. This was instrumental in ensuring quality on Bay Bridge contracts during construction.

13) Caltrans devoted management attention and resources to cultural awareness during the fabrication of the SAS in China, which helped with working relationships during fabrication.

14) The Seismic Safety Peer Review Panel (SSPRP) provided expert advice to the East Span project team from the beginning of design through construction.

15) The TBSRP created the Quality Assurance / Quality Control Expert Panel comprised of subject matter experts employed by the prime contractor, Caltrans, and BATA to review and provide recommendations related to the quality of the SAS overseas steel fabrication.

What Did Not Work

1) A review of best practices for mega-project delivery was not formally performed to determine key processes required to support the program.

2) Clear lines of responsibility, accountability, and communication were not established between the Program Manager, Project Management Team (PMT), and TBPOC. Consideration should be given to have one program manager reporting directly to the decision-making body.

3) The TBPOC did not hold regular public meetings or conduct business through a public process.

4) The TBSRP had a dedicated full-time core team that was augmented with team members who were not exclusively working on the project. At times, this challenged these non-full-time team members with balancing workload and supervision outside of the East Span project.

5) The TBSRP did not implement or regularly update a formal program management plan. This plan should have clearly and formally defined roles responsibilities.

6) The TBSRP did not establish a formalized database for maintaining project records at the beginning of the program that was capable of adapting to the growing needs of the program.

7) The formal risk management program was implemented mid-way through the program during the construction phase of the project and did not provide benefits during the early phases of the project.

8) At times the project struggled to keep elected officials, stakeholders, the media, and the public up to date.

9) Contractor and fabricator input during the design process would have benefited the design phase and minimized costs impacts during construction.

10) Following common practice in the U.S., the SAS contract specifications did not completely define fabrication processes which created challenges in overseas fabrication requiring additional oversight.

11) The Quality Assurance / Quality Control Expert Panel was formally assembled after China fabrication had started, and as a result, the SAS project did not receive the benefits earlier in the project development.

INTRODUCTION

This Lessons Learned Report for the East Span project was requested by Caltrans Director Malcolm Dougherty, assigned to the Caltrans leadership. The scope of this report is to identify and document the practices that worked and those that should be avoided as well as identify consideration for enhancements of existing practices for future mega-projects.

The general basis of gathering information of lessons learned was performed by the review of various existing reports and conducting several interviews of a wide cross-section of individuals directly involved in the new East Span project. The interviews included the Toll Bridge Program Oversight Committee (TBPOC), former Caltrans Director, Project Management Team, Caltrans Chief Deputy Director, Caltrans District 4 leadership, Toll Bridge Program leadership, Seismic Safety Peer Review Panel members, risk management team and former manager, environmental team, quality assurance and quality control expert panel members, contractors, and members of other Caltrans support units and consultants.

The Lessons Learned Report is organized into the following sections: The Governing Body, Toll Bridge Seismic Retrofit Program Organization Structure, Risk Management, Managing Expectations, Project Delivery Method, Quality Management, and Technological Sublime. Lessons learned highlights provided in each of the sections include common themes that were received during interviews with project team contributors.

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THE GOVERNING BODY

This section focuses on the governing body of the Toll Bridge Seismic Retrofit Program, (TBSRP) over time and the lessons learned from the San Francisco-Oakland Bay Bridge (SFOBB) new East Span project. It is important to keep in mind that mega-projects, which are sustained over years or even decades, are evolutionary in their development with decisions being made and approaches taken based on circumstances and best information available at that time. This section reviews the evolution of governance for the East Span project across a broad spectrum of key areas and shared lessons for consideration by managers of future mega-projects.

Lessons Learned

The following are overall highlights of lessons learned that are to be considered for future mega-projects. Contributor input presented as common themes was received through interviews on what worked and what may be improved as it relates to the East Span project.

1. Sponsors of mega-projects should research and assess processes that will be applied during the development lifecycle to ensure that management systems can be put in place to drive the team to the required outcomes in a timely manner.

   ☒ A review of best practices for mega-project delivery was not formally performed to determine key processes required to support the program.

2. Assess and confirm development level and timing for processes required to support the mega-project and develop project-specific procedures and reporting that meet requirements of the program and constituent members of the management structure.

   ☒ Program procedures for risk management, change management, systems integration were not developed and implemented at the onset of the program.

3. Identify stakeholders with responsibility for project functionality, cost, and schedule, for consideration as part of a governance structure for project delivery.

   ☑ The Toll Bridge Program Oversight Committee (TBPOC) consisted of the California Department of Transportation (Caltrans), the Bay Area Toll Authority (BATA), and the California Transportation Commission (CTC). These members represented responsibilities for project functionality, cost, and/or schedule.

   ☑ The TBPOC was an effective governing body concept because it enhanced accountability, oversight to program finances, and resolution of critical issues relating to cost and schedule impacts, and regular reporting to the California State Legislature for the TBSRP.

   ☑ Three agencies joining together added credibility to a unified oversight of the TBSRP. One agency alone may bring a narrower perspective in decision making.

LEGEND
(Common themes from contributor input)

☑	Positive
N	Neutral
☒	Negative

4. Maintain clear lines of responsibility and accountability between the oversight organization and the program manager.

   ☑ The TBPOC clearly defined and formalized their roles and responsibilities.

   ☒ Clear lines of responsibility, accountability, and communication were not established between the Program Manager, Project Management Team (PMT), and TBPOC. Consideration should be given to have one program manager reporting directly to the decision-making body.

5. Evaluate the benefits of an independent delivery governance structure of a mega-project following a public process, particularly where there are political requirements or influences that can adversely affect the functionality, cost, or schedule of the program

   ☒ The TBPOC did not hold regular public meetings or conduct business through a public process.

   ☑ Disclosure of TBPOC decisions were made public via the Metropolitan Transportation Commission (MTC) Board meetings as part of BATA reporting requirements.

Background

Toll Bridge Seismic Retrofit Program Prior to Assembly Bill 144 (1997-2004)

The East Span project was delivered as one of several projects in the TBSRP. That multibillion dollar program began in the early nineties following the 1989 Loma Prieta earthquake and included seismic assessment and upgrade of seven State-owned toll bridges.

With the exception of the East Span, these bridge systems were all seismically upgraded following Caltrans standard project management and project delivery strategies. The East Span presented several unique challenges with respect to scope, technology and Industry Stakeholders (see p.11) which drove changes and program adjustments that resulted in significantly higher costs and extended timelines than originally planned.

Assembly Bill 144 (2005)

In 2005 and following Caltrans reporting of significant scope changes and cost increases in the TBSRP, Governor Arnold Schwarzenegger signed Assembly Bill 144 (reference Appendix A) into law and thereby created the TBPOC to provide project oversight and project control for the TBSRP in California.

The TBPOC, the top-level management structure, was composed of the Director of Caltrans, the Executive Director of BATA, and the Executive Director of CTC. The TBPOC's program oversight and control activities included:

- Review and approval of contract bid documents
- Review and resolution of project issues
- Evaluation and approval of project change orders and claims
- Issuance of monthly and quarterly program progress reports

The TBPOC received management and technical support from the PMT, which includes deputy-level executives from each of the member agencies. The TBPOC and PMT worked as extensions of their respective government agencies and conducted TBPOC business as a project delivery organization.

Shift From Caltrans To Shared Control Program (2005-2013)

The following table illustrates the stakeholders and governance structure during the project development process from planning and design and through construction. See Exhibit 2. The table is not intended to identify the Industry Stakeholders but does highlight the shift from Caltrans to a shared control with state and regional agencies, specifically CTC and BATA, as the TBPOC in providing direct responsibility for project delivery during the construction phase.

Discussion

Exhibit 2: Project Delivery Phase, Stakeholder, and Governance

Project Delivery Phase	Stakeholders (Responsible for Project Delivery)	Governance
Planning Design Construction	Caltrans D4 Consultants MTC*	Caltrans Director ↑ Caltrans District 4 (1997 to 2001)
	Caltrans D4 Consultants Contractors	Caltrans Director ↑ Caltrans District 4 (2001 to 2005)
	Caltrans HQ MTC CTC PMT Consultants Contractors	TBPOC ↑ PMT (2005 to 2013)

*Assisted the bridge type selection structure

The Governing Body

The initial governance structure put in place by Caltrans recognized the challenges associated with replacing the East Span, particularly given its high visibility and regional significance. Two specific actions were taken to address these challenges, including formation of a dedicated East Span project Caltrans team and partnering with MTC in the design selection process. Over time, governance strategies for the program evolved through the project development phases to address issues as they were identified. As the program progressed, the approach to governance was generally reactive, and, in part, driven by concerns raised by Industry Stakeholders and increases in costs as identified in the 2004 California State Auditors Bureau of State Audits report. Projects, including mega-

projects, follow an evolutionary development process that progresses through development of concepts and assessment of impacts (planning), preliminary design and preparation of construction documents (design), and procurement/implementation on site (construction).

During the planning and environmental assessment phase, the governance structure was largely focused within Caltrans District 4 with regular reporting to the Caltrans Director. From the outset, the East Span was recognized as having unique challenges with respect to local and regional interests from the public as well as agencies. Two specific actions were implemented, including a significant organizational shift from the traditional Caltrans discipline matrix project delivery structure to a direct reporting structure of the major discipline managers (e.g., environmental, civil, structures) to the program manager, essentially providing reassigned technical staff from Caltrans for the East Span project. The other key strategy was early and active engagement of MTC as a delivery partner which resulted in the Bay Bridge Design Task Force. The task force provided a public forum for gathering information and early input into the project development process. Around the time that the final environmental document was approved in early 2001 and following the departure of the original Caltrans District 4 Toll Bridge Program Manager, governance shifted to a Caltrans Program Manager assigned to District 4 from Sacramento to guide day-to-day activities. Governance for the next several years focused on addressing cost and schedule issues as the major design decision regarding structure type had already been determined.

While it is typical for a facility's owner and operator to assume the governance role for its projects, mega-projects with regional significance can benefit from, and may require, a broader governance structure. In recognition of this, joint power boards and authorities have been formed to guide some of the largest multibillion dollar transportation infrastructure endeavors, including the Transbay Transit Center in San Francisco and the Alameda Corridor in Los Angeles.

Identifying the goals and objectives of key stakeholders is a critical activity for a project to succeed, and identifying which of these stakeholders might share responsibility for delivery is critical in establishing a sound governance structure and strategy. Following the principle that there are direct and industry stakeholders, governance should come from the direct stakeholder group which has project delivery responsibility and will be tracking project quality, scope, costs, and schedule. This can be a challenge where delivery timelines might be measured in terms of years or decades.

This review of lessons learned for governance on the East Span project follows a broad definition of a good governance structure to deliver a desired outcome. In the recent ASCE publication Managing Gigaprojects: Advice from Those Who've Been There, Done That (Galloway, Nielsen, & Dignum, 2013), Kris Nielsen (2013) defines governance as follows:

> … the establishment of proper program management systems, processes, and management structure to achieve goals and objectives of the various stakeholders, while at the same time making sure the system, processes, and management structure function to maintain uniformity, transparency, and accountability across every aspect of the megaproject (p.5).

Nielsen references the PMI (2008a) to define two general categories of stakeholders for mega-projects, including:

- Direct Stakeholders – project delivery team (e.g., owners, consultants, contractors, suppliers, vendors)

- Industry Stakeholders – affected entities (e.g., outside investors, regulatory agencies, special interest groups, general public, unions, media) (pp.5-6)

In developing a governance approach, the needs of the TBSRP fell into three main areas of consideration, including:

- Functionality (e.g., performance, scope, and quality) – Confirm that the program meets its intended purpose and delivers the required performance
- Cost – Manage program budgets relative to the desired functionality
- Schedule – Manage program schedule

For the TBSRP, the TBPOC was instituted by legislation as the governance structure, which, in some respects, was in reaction to program delivery and cost issues. The TBPOC governance structure represented a broader set of direct stakeholders that held responsibility for functionality, schedule, and budget. (See Appendix B.) The TBSRP had clear responsibility for ensuring seismic safety (functionality/quality). The responsibility of budget was principally born by BATA, the agency that was administering the funding. Schedule was held as high priority for all, particularly given the seismic safety purpose of the East Span project.

Transparency and Accountability

Transparency and accountability are necessary elements of informed and timely decisions, and are driven principally by the approach that the governing body takes in conducting the business of the project. The early phases of the East Span project were managed within the Caltrans agency framework where accountability is internal to government agencies and transparency is a managed and tightly controlled activity. The later TBPOC phase expanded accountability to a three-agency oversight body, and increased transparency, although it was still maintained as a managed activity. Looking at other mega-projects, there are two characteristics of a governance structure that should be assessed for future projects to improve accountability and transparency, including establishing an independent delivery entity and using a public process to conduct project business.

An independent entity, such as a management team led by a program manager and overseen by a board of control, is a proven and effective delivery structure for large and complex programs, and is a common practice where there are multi-agency jurisdictions with project delivery responsibility. The East Span project generally used this approach with the formation of the TBPOC, representing three agencies (i.e., Caltrans, BATA, and CTC) as a board of control led by a chair person. The PMT, which reported to the TBPOC, was also comprised of representatives of the three agencies, and effectively became a "shadow" board of control. The TBSRP Program Manager was part of the three-member PMT. With the inclusion of the program manager as a member of the PMT, the PMT structure was somewhat compromised in terms of its independence from project management and as an advising body to the TBPOC. By several accounts, this resulted in questions regarding roles and responsibilities, and broken lines of communication. In this respect, transparency and accountability appears to have been compromised with the structure where the program manager is not wholly accountable to the full board of control, but part of an oversight team whose members maintain reporting lines to their respective members of the board of control. Notwithstanding the difficulties inherent in the PMT structure, group members persevered and fulfilled their responsibilities.

One approach to increase transparency and accountability that was not introduced in the project is the use of a public process for conducting project business. A public process introduces a level of transparency and accountability that drives several key activities that

can have an overall positive effect on project delivery, particularly for projects that cross multiple jurisdictions and have high regional significance and political visibility, including:

- Public Process for Project Delivery – Provides regular public and media access, establishes a level of openness for discussing issues and decisions, generates trust with external stakeholders
- Documentation – Requires a high level of discipline and completeness for addressing issues, including preparation of agendas and meeting materials to support decision making, meeting minutes, and tracking of actions
- Communication – Creates a need for the project team to be proactive in communicating and addressing issues with affected stakeholders, including legislators and regional agencies, to support effective discussion and decision making in the board of control meetings
- Challenges the Project Team – Drives the team to develop comprehensive approaches and solutions that address the critical issues with a long term perspective and does not compromise future work or phases

Adopting a public process for project delivery introduces another layer of visibility that requires a more disciplined and proactive approach to accountability and transparency by the delivery team, which can have long term positive effects in terms of developing trust with internal and external stakeholders.

It is important to note that a public process does not compromise the requirement to address project business that is confidential or not otherwise appropriate for public review. In these instances, it is common for closed-door sessions to be held before or after the public session of a public board of control meeting.

Processes and Procedures

During the early governance phases, the East Span project initially applied procedures in accordance with Caltrans project development manuals. These manuals had been successfully applied to other toll bridge seismic retrofit projects, including replacement of the Carquinez Bridge ($200 Million construction) and design/construction of the new Benicia-Martinez Bridge ($1.2 Billion construction).

Although generally adequate and appropriately supportive of the East Span project, the approach to identification and further development of management processes appears to have been reactive in some significant areas, including the areas of risk management and integration management, which were formally introduced in later phases of the project. This is not to say that risk and integration management as processes were wholly ignored but rather that processes within established Caltrans manuals and procedures were not sufficiently robust to address the magnitude and complexity of the issues that eventually came to light on the project.

A more proactive approach to understand, develop, and implement applicable project processes in a timely manner would have provided a more structured approach to address emerging issues. This is particularly evident in the areas of risk and integration management where the project team took action and implemented more formal processes once the need was identified.

Summary

The appropriate governance structure of a mega-project should be broadly assessed in the context of the needs of the program rather than in the context of an existing owner organizational structure. Mature organizations have developed systems, processes, and an organizational structure to deliver well on their core functions. While an organization can sometimes be pushed beyond the intended levels of its management structure and be successful, delivery of a mega-project (once in a generation for most professionals) is typically well beyond the standards and management approach for which an organization has been developed, particularly where there may be significant stakeholders external to the organization.

The level of success of a governance structure is dependent on the individuals assigned to key responsible roles. These roles and responsibilities must be clearly defined and lines of communication established and followed. All of the key managers must instill discipline and transparency into the team and processes, as well as bring an open and collaborative approach to the governing team to bring about a high level of trust and support timely decision making.

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TOLL BRIDGE SEISMIC RETROFIT PROGRAM ORGANIZATION

This section focuses on the lessons learned from the program management organization of the East Span project after the passage of Assembly Bill 144. The discussion will explore the Toll Bridge Seismic Retrofit Program (TBSRP) organization structure, management best practices, and communications.

Lessons Learned

The following are overall highlights of lessons learned that are to be considered for future mega-projects. Contributor input presented as common themes was received through interviews on what worked and what may be improved as it relates to the East Span project.

1. The size and complexity of a mega-project requires an organizational structure that has a full-time team with adequate resources working towards the goal of project delivery through a common reporting line structure to the program manager.

   [N] The TBSRP had a dedicated full-time core team that was augmented with team members who were not exclusively working on the project. At times, this challenged these non-full-time team members with balancing workload and supervision outside of the East Span project.

2. Mega-project program managers should have direct reporting and access to the highest levels of leadership within the organization.

   [☑] The TBSRP Program Manager reporting to the Caltrans Director was an effective organization structure as it provided the support and attention at the highest of levels within the organization of a complex mega-project.

3. From the onset, mega-projects should formally define clear roles and responsibilities for all levels of the program in a formal program management plan that is reviewed and updated regularly or as needed when changes arise.

   [☒] The TBSRP did not implement or regularly update a formal program management plan. This plan should have clearly and formally defined roles responsibilities.

4. A fully integrated information management system needs to be set up and implemented at the start of the mega-project and managed program-wide by a document control team. This system should support future requirements of project maintenance and operation information systems as part of the records retention practices.

   [☒] The TBSRP did not establish a formalized database at the beginning of the program that was capable of adapting to the growing needs of the program.

LEGEND
(Common themes from contributor input)

☑	Positive
N	Neutral
☒	Negative

5. On a mega-project, co-locating all parties is effective in fostering working relationships, collaboration, cooperation, and communication.

   ☑ The TBSRP co-located all parties to Pier 7 in Oakland. This central location created a campus environment that fostered team work, accountability, and communication. Parties included environmental, design, construction, small business, and contractor staff. In addition to Pier 7, the program implemented co-location at the detailer's shop in Canada during the SAS contract shop-drawing phase and at the fabricator's shop in China during the Self-Anchored Suspension (SAS) steel fabrication, helping to resolve issues on site in a timely manner.

6. It is important to establish relationships with key firms (e.g., detailers, fabricators, suppliers, and others) that are critical to the overall completion of a project.

   ☑ The TBSRP leadership communicated effectively during the construction phase with various fabricators through well-timed visits, helping to build relationships and provide a greater understanding of the complexity of the fabrication and the associated quality and schedule challenges.

7. People and talent matter at all levels of a mega-project organization. Staff with commitment, expertise, and ability to adjust to the changing environment of a mega-project are vital to its on-going and overall delivery.

   ☑ The TBSRP organization was comprised of staff with the commitment, expertise, and ability to adjust to the changing environment of this mega-project.

8. Support of mega-projects should maintain good formal and informal partnering practices with internal and external stakeholders to improve communication, collaboration, and cooperation for the success of the project.

   ☑ The TBSRP leadership engaged various external permitting agencies throughout the project, which positively impacted the project towards completion.

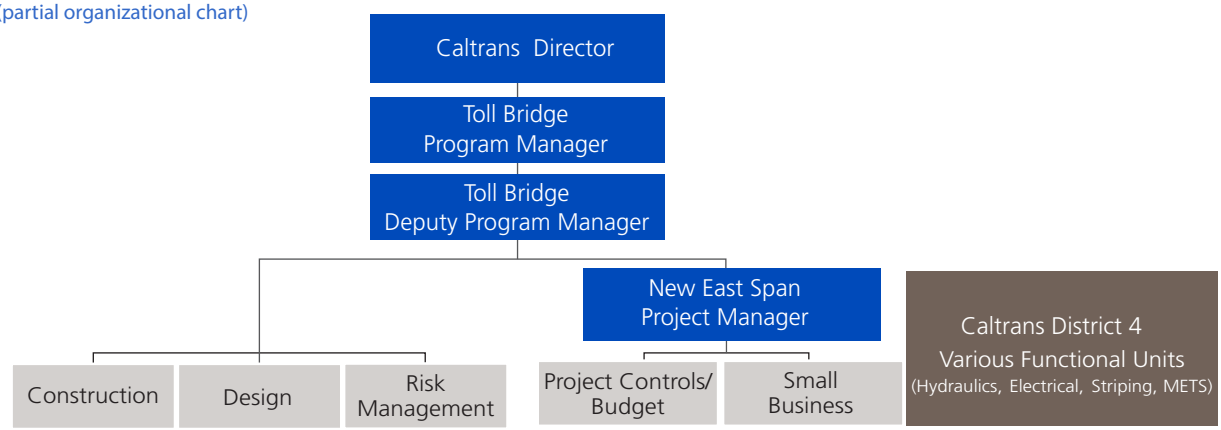
   ☑ The TBSRP established formal and informal partnering activities with prime contractors on a regular basis that helped develop relationships for efficiently addressing challenges.

Discussion

ORGANIZATION STRUCTURE

The Toll Bridge Program key personnel were dedicated full-time project staff, reporting to the program manager with the common goal of project delivery. This program team included project management, project controls, small business, risk management, design, and construction. See Exhibit 3.

Exhibit 3: Toll Bridge Seismic Retrofit Program Organization Structure
(partial organizational chart)



During design and construction, the project utilized staff beyond the full-time dedicated team to perform services such as hydraulics, electrical, and METS. These team members were not dedicated full time to the project and were challenged with balancing workload and supervision outside of the East Span project. The East Span project was made a high priority throughout the Caltrans organization, helping to alleviate the potential conflict by having a common goal for all project team members and their supervisors.

The Roles of the Project Team

The management structure of the toll bridge program was effective largely due to the skill set present in the members of the management team. The individuals assigned to these positions shared a common approach to management. Their methods included open communications throughout staff levels and divisions, encouragement of the development of non-traditional solutions and problem solving through participation of the larger team that included staff, consultants, and contractors.

While adherence to established standards was important, a project of this size and complexity requires knowledge, expertise, judgment and innovation to deliver. The management team's common vision of allowing their teams to pursue innovation and nonstandard solutions to challenges was uncommon within a group that historically was limited to standards that did not always address the issues needing resolution.

Exhibit 4: Toll Bridge Program Oversight Committee Organization Structure

PROGRAM MANAGER

The program manager was responsible for overseeing and delivering all of the projects within the toll bridge program. Knowledge of project history, politics, regulatory context, federal involvement, and Departmental organization were key elements in performing the tasks of the position. Pre-existing professional relationships with individuals from each of

the relevant areas were critical to delivering the projects in the program.

DEPUTY PROGRAM MANAGER

The deputy program manager supported the program manager in delivering the projects within the toll bridge program. The position required a similar knowledge of project history. In addition the position required strength in structural and seismic design. Due to the complex nature of the projects the deputy program manager had to balance the pragmatic application of design to the reality of construction.

PROJECT MANAGER

The project manager was responsible for delivering the projects associated with the seismic retrofit of the Eastern Span of the San Francisco – Oakland Bay Bridge. The position required organizing teams and internal and external communications practices that were critical to delivering the projects. The project manager also identified potential problem areas and developed team-based solutions to address them.

Adjusting to Mega-Project Needs

Each organization has a culture that influences management and staff as well as processes, communications, and project delivery. Caltrans' organizational culture has evolved around delivering all aspects of a project from planning and environmental through design and construction from start to finish. The organizational culture impacts how it does business and delivers projects. Caltrans' standard way of doing business is reflected in:

- Staff size and technical capabilities
- Standardized design procedures and manuals
- Existing procurement processes and capabilities

Caltrans' existing delivery methods, processes, and manuals that are well-suited for traditional transportation projects were challenged by the large scale and complexity of the East Span project. At times, this project required Caltrans to bring in top-tier subject matter experts who assisted with evaluating technical issues and provided necessary recommendations that fell outside of the available in-house expertise. See the Quality Management section for examples.

The global sourcing of the project and with all of its complexities, required management to establish in-person visits to the fabrication facilities to communicate the owner's commitment and establish a partnership allowing for an avenue for success. The relationships built as a result of these trips helped in the resolution of critical fabrication issues.

Management Best Practices

ROLES AND RESPONSIBILITY

The Toll Bridge Program's role and responsibility was to deliver a quality project on schedule and on budget. In addition to this, the program was required to provide the latest information and develop memoranda that were presented to the TBPOC for decision making on a monthly basis. This process was necessary in order to receive TBPOC approvals on specific issues (e.g., change orders of more than $1 Million) prior to proceeding with work.

Roles and responsibilities for the TBSRP staff were generally defined in the project management plan, but there is a question if they were clearly defined, formalized, kept up-to-date, and communicated amongst management staff. (This was also discussed in The Results Group Report (2005).)

DOCUMENT CONTROL AND RECORD RETENTION

A mega-project requires a robust document controls system. The quality of documentation must be accurate so that when an issue is examined, decision makers have the complete informational thread from the beginning of the issue to the end. The story line, tracked in its entirety, prevents project teams from recreating the wheel. Quality and structured documentation allow for the issue to remain current and accurate, especially when new team members join a complex project spanning several decades. On a project that spanned more than 15 years, not having a consistent format created the following challenges:

- The need to reconstruct misplaced information
- The inability to provide information in a timely manner requested by team members, the media, and the public

The East Span project required more than 15 major construction contracts to build the structure. The East Span project teams' document control system was labor intensive and inconsistent across all of the contracts. For example, some contractors had proprietary software, while others used Caltrans' software. In addition, the project lacked the centralized document management system to retain all records through the life of the project. Instead, documents are stored and managed with various and non-integrated systems. The different functional units such as design, construction, Materials Engineering and Testing Services (METS) and others maintain their own system of document control, thus limiting access to all project staff and management. This lack of a program-wide document management system made it difficult at times to retrieve documents in a timely manner when requested by the public. The need to archive documents on earlier contracts such that they could be accessed on later contracts (or throughout the life of the whole project) was not apparent when the project began.

At the end of the construction phase, project documents are transferred to the owner/operator that will provide the long-term maintenance of the bridge structure. Documents may include contract drawings and specifications, shop drawings, source inspection reports, etc. Typically, this material is scanned and stored into the Caltrans Bridge Inspection Records Information System (BIRIS) for future use. Currently, there are other technologies that utilize 3D models that connect to relevant information stored into an integrated database. The TBSRP is currently looking into these reliable and accessible bridge data management system alternatives in the interest of implementing streamlined and cost effective bridge maintenance and management program that will allow the program to better respond to critical maintenance issues as well as preserve the life of the structure.

PIER 7 CO-LOCATION DURING THE CONSTRUCTION PHASE

The project team was co-located at Pier 7 during the construction phase. Team integration provided an opportunity for key, full-time members of the design, contractors, construction, and management teams to collaborate in one location with the project contractors at the project site. There was a human element created through the co-location of parties as it fostered open communications and personal interaction on a daily basis. The

campus-type environment created an overall theme of collaboration, communication, and cooperation amongst all parties that was promoted by the upper management.

The Pier 7 campus created an on-site venue, known as the working drawing campus, to discuss any and all project issues between the parties. This on-site, face-to-face interaction became pivotal to the quality and the efficiency of responses to issues and resolutions. In addition, co-location allowed the team to leverage tools such as weekly videoconferences with the project team members nearly 6,000 miles away in China to maximize communications and effectively document progress and consensus.

Summary

A mega-project requires an organization structure with a full-time dedicated team with clearly defined roles and responsibilities. The program manager needs to be empowered to make decisions and have access to top leadership in the oversight organization. The team needs to have strong resources, systems, and tools throughout the project and team co-location is highly recommended. The people who work on the project need the drive, commitment, expertise, and ability to adjust to change. One of the biggest drivers for success of a project is the people who work on it — people matter.

RISK MANAGEMENT

This section highlights the lessons learned related to the Toll Bridge Seismic Retrofit Program (TBSRP) formal risk management program that the Toll Bridge Program Oversight Committee (TBPOC) implemented on the East Span project to meet the requirement of Assembly Bill 144 (reference Appendix A).

Lessons Learned

The following are overall highlights of lessons learned that are to be considered for future mega-projects. Contributor input presented as common themes was received through interviews on what worked and what may be improved as it relates to the East Span project.

1. Mega-projects must have a robust risk management program supported at the highest levels of the project that covers all aspects and phases of the project. The risk management process will help the program articulate the risks and, therefore, set realistic expectations.
   - ☑ The TBSRP had a robust risk management program that informed major decisions on the project after 2005.
   - ☒ The formal risk management program was implemented mid-way through the program during the construction phase of the project and the early phases of the project did not benefit from a formal risk management.

2. On mega-projects, the risk management team should be part of the overall TBSRP management team, and the risk management analysis has to be thorough enough to be able to inform management decisions on the project relating to schedule and costs.
   - ☑ The risk management team was part of the TBSRP management structure that provided input on the program's schedule and costs relating to identified risks.

3. The development and management of program cost contingencies need to be tied to the risk management process. The size of a project contingency should be determined by the risk assessment documented in the risk register and should be based on the defined quantified costs in the risk register.
   - ☒ The risk management process was implemented during the construction phase of the project and early engineering estimates did not take into account risk analysis.
   - ☑ A later cost estimate developed in 2004, included project cost contingencies that were derived through a risk management process.

4. Use schedule risk analysis practices based on the Monte Carlo method — a standard statistical algorithm for probability ranges of the scheduled task — to create and manage the overall project schedule during the planning, design, and construction phases of the mega-project.
   - ☒ Schedule risk analysis was not performed on earlier phases of the East Span project.

LEGEND
(Common themes from contributor input)

☑	Positive
N	Neutral
☒	Negative

☑ The TBSRP started performing schedule risk analysis during the start of the construction phase to support decisions on the overall corridor schedule.

5. Create task forces, as needed, to address a particular issue identified in the risk register. Task force teams should be multidisciplinary groups that can bring a multifaceted approach to developing risk mitigation solutions.

   ☑ Multidisciplinary task forces were created to assess and resolve specific high risk project issues.

6. If possible, when addressing an identified risk, do so in a manner that does not change the parameters defined in the contract documents. Once the scope is changed by the owner to mitigate a risk, the risk is transferred from the contractor to the owner. Even though a risk may be mitigated, once the contractor's responsibility to the contract has been reduced, the potential for increased costs or the emergence of other unanticipated risks increases.

   N The TBSRP management team made the choice to expend contingency budget to fund changes to individual construction contracts in order to mitigate schedule risk, but in the process Caltrans assumed portions of the contractor's risk.

Background

Risk Management Prior to Assembly Bill 144 (1997-2004)

Prior to Assembly Bill 144, which required the use of a formal risk management program on the East Span project, there was no comprehensive and resourced risk management program for the TBSRP. During that time, risk management was done on an ad hoc basis. As a result, there was no formalized process where risk management was used to generate budget contingencies and construction schedules. In December 2004, the California State Auditor Bureau of State Audits (BSA, 2004) released a report entitled, "Department of Transportation: Various Factors Increased Its Cost Estimates for Toll Bridge Retrofits, and Its Program Management Needs Improving." According to the report, there were no risk management documents from 2001 to 2004.

BSA 2004 Audit Report Findings/Recommendations (December 2004)

The BSA (2004) report was performed by the Joint Legislative Audit Committee on the Department of Transportation's (Caltrans) TBSRP. The report examined the cost increases for the program between its budget established in 2001 and its August 2004 cost estimate, as well as Caltrans' project management practices for the program. The audit stated that Caltrans neglected several important aspects of program management. The following are statements related to risk management:

- "Although Caltrans took steps to identify and mitigate risks to the East Span project, such as hiring consultants to perform a risk assessment in February 2003, it lacked a comprehensive risk management plan for the East Span."
- "Without a risk management plan, Caltrans never defined its risk management

activities for the program. As a result, Caltrans lacked processes to identify, track, and quantify risks throughout the project's life."

- "Caltrans did not use information about identified risks to regularly reassess its contingency reserves for potential claims and unknown risks." (p. 3)

The BSA (2004) audit recommended that Caltrans should continue to revise its risk management practices and include the following:

- "Establishing a comprehensive risk management plan that clearly defines roles and responsibilities for risk management and addresses how it will identify and quantify project risks, implement and track risk response activities, and monitor and control risks throughout the life of the project."
- "Quantifying the effect of identified risks in financial terms."
- "Developing and maintaining documents to track identified risks and related mitigation steps." (p. 5)

To ensure that it follows generally accepted practices for cost management, Caltrans should:

- "Regularly update its estimates of capital and support costs."
- "Regularly reassess its reserves for potential claims and unknown risks, incorporating information related to risks identified...." (p. 5)

Assembly Bill 144 (2005)

Shortly after the BSA (2004) audit presented findings and recommendations on the TBSRP, the Legislature passed Assembly Bill 144 in 2005 requiring Caltrans to manage the risks associated with the Toll Bridge Seismic Retrofit Projects by taking the following actions:

- Establish a comprehensive risk management plan that clearly defines roles and responsibilities for risk management and addresses the process by which it will identify and quantify project risks, implement and track risk response activities, and monitor and control risks throughout the duration of the project
- Quantify the effect of identified risks in financial terms
- Develop and maintain documents to track identified risks and related mitigation steps.
- Regularly reassess its reserves for potential claims and unknown risks, incorporating information related to risks identified and quantified through its risk assessment processes
- Regularly integrate estimates for capital, capital outlay support costs, and contingency reserves into a program-wide report

Caltrans Formal Risk Management Program (2005 to 2013)

In response to the BSA (2004) audit and the requirements of Assembly Bill 144, Caltrans implemented the following on the program:

- Enhanced the Calrtans' risk management plan and activities
- Quantified identified risks and regularly reassessed financial reserves based on those risks
- Provided regular detailed updates on program progress, risks, and budget status to stakeholders

Discussion

Risk Management Program

In 2006, risk management best practices were new to the TBSRP, as well as to the entire Caltrans organization. Using risk management effectively required a cultural change within Caltrans. Putting risk management at the center of the program involved a multidisciplinary approach which required managing through Caltrans established "silos." This encouraged communication and collaboration across many different Caltrans groups.

To gain support from staff, the risk management team had to show demonstrable benefits using risk management. Although many of the management staff received risk management training, Caltrans needed time to accept and adopt the practices of risk management into its culture. Initial efforts to start the risk management program on the project faced challenges as Caltrans was learning how to move away from its established ways of delivering a project. Once the practice was formalized and implemented, the TBSRP at all levels received a better understanding of the benefits of risk management. The TBSRP approach to risk management involved an integrated team of multidisciplinary members collaborating and communicating on identifying risks in each respective part of the project.

RISK MANAGEMENT IMPLEMENTATION

The TBSRP benefited from the formalized risk management approach only after it was implemented during the construction phase. If introduced earlier during the planning and design stages, the East Span may have benefited more from avoiding or mitigating earlier risks and if tied to the management decision-making process. Having a risk management program established at the beginning of the project would have helped set more reasonable expectations for the project costs and schedule at the start of the program. Examples of areas of earlier potential opportunities to managing risks may have included:

- Provide a more systematic approach to mitigating some of the early schedule delays and cost expectations
- Provide a framework on setting up the project team
- Provide early frame work for the packaging of the East Span design contracts, thus avoiding some of the contract re-packaging that occurred during mid-design phase

It was equally important for all levels of the East Span project to understand the implication of scope and contract term changes after a contract was authorized. Management should vary from the contract terms and scope only when necessary, otherwise the project cost increases and the risks are reverted back on the owners.

RISK MANAGEMENT TEAM

A major action the TBSRP took toward implementing a formalized risk approach was to establish a full-time dedicated program risk management team that was comprised of the risk manager, risk management coordinator, and consultants.

The risk manager oversaw the risk management team, comprised of two dedicated risk management specialists and their consultant and the construction schedule team that provided independent reporting to the Toll Bridge Program Manager.

The risk manager, an important role to the success of the risk management program, communicated and collaborated regularly with the team at all levels on the identified risks

and the management of the risk contingency budget. The risk manager was supported with a team of qualified expert consultants and technology at the start of the program.

COMMUNICATIONS AND REPORTING

The team held regular quarterly meetings and re-evaluated risks on all projects, revised the risk response plans accordingly, and updated potential impacts on project and program contingencies. Capital outlay and capital outlay support cost estimates were regularly updated, along with the potential impacts on contingency reserves from the risk management team. These updates were included in quarterly reports to the Legislature and the California Transportation Commission. These efforts allowed information to be transparent amongst all levels of the project team as well as with the stakeholders.

RISK MANAGEMENT TECHNOLOGY

The best practices of risk management require resources to support innovative software solutions. Future mega-projects should budget for these types of resources to help in the implementation of the risk management plan early on in the project.

Risk Management of Cost Contingency Forecast

A major aspect of the TBSRP risk management program was cost risk management. Cost risk management was used to establish the contingency forecast for each of the contracts. Total budget for the contract was the contract bid amount plus the contingency. Each of the individual contract construction cost estimates included cost contingencies developed through a risk analysis process that evaluated quantitative risk and the percent chance of a risk occurring to establish a project contingency amount. The quantitative risk dollar amounts for each of the individual risks listed in a given contract's risk register were added together to form the total for contingency amount for that contract. During construction, if it was decided to mitigate some risk through a contract change, the budget for the contract change order (CCO) came from the project contingency balance. As money was transferred from the contingency to fund the CCO, funds were shifted from the contingency balance to the actual project budget.

SCHEDULE RISK MANAGEMENT

Traditionally, Caltrans would develop the analysis by using traditional scheduling tools and basing it on the experience and knowledge of Caltrans construction staff; it was not included as part of the risk analysis process. On the East Span, the risk management team performed a schedule risk analysis in conjunction with the development of the schedule. This was important in part because the primary goal of the East Span project was seismic safety. As a result, schedule was deemed more important than cost.

Information is analyzed in a probabilistic manner using the Monte Carlo simulation method that provided a range of possible time durations that an identified risk may occur. This effective tool of schedule risk analysis became a key decision-making tool that allowed the TBPOC to be better informed about the timing of critical construction events. Schedule risk analysis helped the TBPOC determine the amount of days needed for construction during the major bridge closures. Assigning the probability and severity to the risk items identified on the risk register for each contract, and on the corridor as a whole, informed the schedule risk analysis. Therefore, identifying the risks that could have the biggest impact on the schedule received added resources and attention toward mitigating those risks.

Examples of Risk Mitigation Efforts

The East Span project was effective in mitigating risks that had the highest potential to impact the schedule when resources were allocated to address identified risks. The management team successfully created specific task force teams to manage and resolve identified risks. Examples of these task force teams included mitigating risks related to overseas steel fabrication tolerances, main cable installation, quality management of overseas steel fabrication, preparations for the seismic safety bridge opening, and others. The task force teams effectively and jointly mitigated risks. The integrated task force was made up of empowered representatives from risk management, the owner's construction and design team, quality management, and the contractor.

QUALITY MANAGEMENT OF OVERSEAS STEEL FABRICATION

Managing steel fabrication overseas was identified as a critical risk. To mitigate this, the management team provided the adequate resources of material inspection engineers and construction management staff to oversee the quality of fabrication work. The quality management process was enhanced with a number of inspection layers that included quality control inspectors (both by the fabricator and contractor separately) and quality assurance inspectors (by the owner). The management team implemented a progressive acceptance of the fabricated material, known as the Green Tag process, streamlining all facets of inspection. This in-depth level of inspection provided confidence that the final fabricated product met or exceeded the requirements of the contract. In addition to these efforts, a robust database was implemented to record and archive all major steps and processes of the steel fabrication work.

SELF-ANCHORED SUSPENSION CABLE FOCUS TEAM

This is the first single cable suspension span in the world. The Cable Focus Team (CFT) task force was formed to address risks related to the Self-Anchored Suspension (SAS) main cable system. The CFT met every week to find solutions and mitigate risks to cable issues such as main cable installation, construction tolerances, cable compaction, load transfer, and others. The CFT was a multidisciplinary team that included the contractor. The CFT was an example of a task force that was successful at proactively mitigating cable risks, thus preventing potential schedule delays.

YERBA BUENA ISLAND DETOUR TEAM

The Yerba Buena Island Detour Team (YBIDT) met regularly with the contractor to find ways to prevent schedule delays. Additional fabricators were added by the contractor at the request of the YBIDT to speed up the fabrication schedule of the new steel deck section that was to be "rolled-in." In addition, the YBIDT worked with the contractor to develop a comprehensive risk contingency plan before the roll-in/roll-out activity. The risk management team worked with the YBIDT to determine the optimal closure period required for the opening of the YBI Detour, which guided the management's decision on how long the bridge would be closed for the bridge construction operation. The YBI Detour operation benefited from an active risk management approach, and once applied, schedule delays were prevented with the solutions developed by the construction and the design teams with input from the risk management team.

EAST SPAN FOUNDATION WORK

Caltrans took proactive actions during early project development through final design and construction to aggressively mitigate potential foundation risks. Caltrans performed comprehensive site investigations throughout the project site. The East Span project is credited as the first major transportation project which made use of state-of-the-art methodologies for characterization of the bridge site. The project integrated geophysical survey techniques with actual geotechnical borehole and in-situ soil tests. In addition, Caltrans integrated the geotechnical experts into the overall design team at the start of the design process. This collaboration led to improved foundation designs and specifications. During construction, the geotechnical team was key members of the Caltrans construction oversight team. Caltrans also brought in many recognized seismologists, geologists, and geotechnical engineers into the project. As a result of these actions, Caltrans experienced zero claims related to foundation construction on the East Span project. This was unusual because, on other Caltrans projects, most of the construction claims originate from foundation construction.

Summary

After the passage of Assembly Bill 144, the TBSRP was required to implement a robust and integrated risk management process. The risk management analysis developed was thorough enough to support management decisions on the project relating to schedule and costs. The corridor schedule developed, after Assembly Bill 144 passed, used the schedule risk analysis to set when the bridge would open. That schedule was met. The overall lesson learned in this section is that mega-projects should implement a formalized and comprehensive risk management program from the onset of the project, even prior to the development of the original cost estimate. Although the TBSRP risk management program was considered a success, the new East Span project did not get the full benefits during the early phases of the program because the risk management program was implemented mid-way through the program after construction had started. By the construction phase, the project benefited from cost estimating that included program contingencies derived by the risk management analysis.

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MANAGING EXPECTATIONS

This section will generally focus on the lessons learned related to managing expectations on the East Span project. Managing expectations for the project includes reporting to the State Legislature and elected officials, communicating with project stakeholders and the public, and working with the media.

In many cases with mega-projects, the expectations are one of the biggest challenges the project faces. In the ASCE publication Managing Gigaprojects (Galloway, et al., 2013), Kris Nielsen (2013) elaborates on this concept:

> "Every reaction by regulators, financial institutions, shareholders, and the public taxpayer is based on and flows from their expectations of an organization's senior management, directors, or government overseers. Those expectations may or may not be based upon the reality of the conditions within which the organization is operating; in fact, expectations may be based on little or no information. Too often, expectations arise out of information that has little direct bearing on the issue under examination" (p. 9).

Lessons Learned

The following are overall highlights of lessons learned that are to be considered for future mega-projects. Contributor input presented as common themes was received through interviews on what worked and what may be improved as it relates to the East Span project.

1. To manage expectations on a mega-project, qualified and dedicated professionals as well as respected outside expertise and robust communication and risk management teams are needed from beginning to end to deliver the project.
   - ☑ The project had qualified professionals and respected outside expertise throughout.
   - ☒ The project did not always have robust communication or risk management resources.

2. Mega-projects should establish an open executive decision-making process to successfully manage expectations and to provide transparency to the public and stakeholders.
   - ☒ The Toll Bridge Program Oversight Committee (TBPOC) did not have an open meeting process.

3. Critical project information must be communicated in a clear, concise, and timely manner internally to ensure good decision making and externally to provide clarity and transparency. Mega-project owners should also consider innovative delivery methods to communicate critical information such as project status and public safety.
   - ☑ The project team found innovative ways of delivering project information such as creating an online media bar, using Google Earth, and developing mobile applications to reach out to the public.

LEGEND
(Common themes from contributor input)

☑	Positive
N	Neutral
☒	Negative

☒ At times the project struggled to keep elected officials, stakeholders, the media, and the public up to date.

4. Mega-projects should make an extra effort beyond legislatively required reporting to keep elected officials up to date with the status of the project. Keeping this audience continually updated is critical to decision making that affects project delivery.

   ☒ The project struggled with updating elected officials. Although quarterly reporting was later legislated and instituted, on-going additional efforts to ensure that elected officials were aware of current project status were not regular.

5. Managing expectations of a mega-project is best accomplished when the communications team is empowered to speak with one voice from the project site representing the direction of the governing body throughout the entire life of the project.

   ☒ The TBSRP communications team had a process that provided access to information and transparency helping foster trust with the media. However, this process was not established at the onset of the project prior to the creation of the TBPOC and was not continuous or consistent through to the end of the project.

Background

Most of the important issues related to reporting to the State Legislature occurred prior to the passing of Assembly Bill 144 in 2005 (reference Appendix A) and have been well documented in other reports that are cited in this section for further review. Transparent reporting or communicating — whether it be to elected officials, stakeholders, the media, or the public — remains a core element of managing expectations.

Project Communications Prior to Assembly Bill 144 (1997-2004)

The status of the TBSRP was communicated to multiple audiences in different ways over the life of the project. The project was initially managed directly by Caltrans. During this time, Caltrans reported directly to the Business, Transportation and Housing Agency under the Governor. Caltrans came under intense scrutiny for the accuracy of its cost estimates, the failure to implement comprehensive risk management, and reporting progress on the project.

Bureau of State Audits 2004 Report Findings/ Recommendations (December 2004)

In December of 2004, the California Bureau of State Audits (BSA, 2004) published a report that analyzed several of Caltrans program management practices and concluded the following related to managing expectations:

- Caltrans failed to disclose information to the Legislature according to the law's regular reporting schedule and disclosed huge cost overruns long after it should have been aware of them. Caltrans' cost update for the August 2004 report to the Legislature was its first program-wide update of cost estimates since April 2001.
- In November 2003, Caltrans' financial plan update to the Federal Highway Administration (FHWA) did not reveal the probable extent of estimated program costs. At that time, based on internal reports, Caltrans should have known that the program was over budget.
- Caltrans had neglected communications planning and management, failing to inform significant stakeholders regularly of relevant changes in its estimates of program costs and cost overruns.

While Caltrans was criticized for its management of the program, external influences such as steel material escalation trending beyond predicted models, insurance, and bonding escalation due to the 9/11 terrorist attacks, project scope changes, and political indecisiveness were key contributors to cost and schedule increases. The Results Group (2005) found that the three fundamental factors contributing to cost escalation on the project were 1) external market conditions, 2) design complexity, and 3) time increases due to design changes. Caltrans responded to the audit and began improving its risk management and communication practices.

California Assembly Bill 144 (2005)

In July of 2005, Governor Arnold Schwarzenegger signed Assembly Bill 144 that brought together Caltrans, the Bay Area Toll Authority (BATA), and the California Transportation Commission (CTC) to form the Toll Bridge Program Oversight Committee (TBPOC). From that point, the TBPOC would jointly oversee the construction and management practices for the TBSRP. This includes communications and reporting to the Legislature and the public.

The process for making decisions after Assembly Bill 144 created the Toll Bridge Program Oversight Committee (TBPOC) was not open to the public. Regular reporting was performed according to legislation and a communications partnership team (CPT) was created by the TBPOC to make sure the public was aware of important project information. Regardless, there continued to be a perception that important decisions that should have been subject to public scrutiny were made behind closed doors.

Although the TBPOC decisions led to the successful opening of the project within the timeframe and funding articulated in legislation as it relates to managing expectations, the fact that the committee's meetings were not held in public created a lack of transparency. When elected officials, stakeholders, the public, and the media were made aware of potential issues before they happened (as with the bridge closures that became necessary in 2006, 2007, 2009, and 2013) or were given access and information quickly when unforeseen issues occurred (as with the eyebar failure in 2009), questions were resolved swiftly. When unexpected problems such as the failure of the Self-Anchored Suspension (SAS) A354 BD rods in 2013 occurred without prior explanation or swift access and information the lack of transparency in the decision-making process was reported by the media and did not help foster trust.

Communications Management Under the Guidance of TBPOC (2005 to 2013)

The TBPOC outlined its goals as referenced in the 2007 East Span Strategic Plan Briefing Document (see Appendix C):

1) Accelerate the schedule to deliver seismic safety ahead of September 2013;

2) Maintain positive relationships, communication, and outreach with the public and stakeholders to ensure smooth project implementation; and

3) Maintain fiscal responsibility while supporting schedule acceleration and deliver the program.

The opening of the East Span project was on time in September of 2013 and remained within the program budget (including contingency) and schedule established per Assembly Bill 144, effectively meeting its first and third goals. To meet its second goal, the TBPOC established a CPT made up of staff from each agency that were responsible for developing and implementing the project's communications plan. For most of the project the CPT was well-resourced and found innovative ways to reach the public, the media, and stakeholders.

Discussion

Managing Expectations

REPORTING TO ELECTED OFFICIALS

As discussed in the Bureau of State Audits (2004) report, Caltrans did not officially report timely cost and schedule information to the Legislature in several instances. The lack of any record of official reporting ultimately led to the Legislature having six weeks to formally devise a funding solution before the original bid on the SAS superstructure was set to expire in 2004. A lack of information and project familiarity caused elected officials to struggle to provide timely and helpful solutions.

To address this issue, the TBPOC instituted a process of preparing quarterly reports to the Legislature that were made available to the public. The TBPOC also held an annual presentation in Sacramento on program progress. Coordination between the risk management team and the communications team identified project challenges such as bridge closures that required project-specific presentations to be held at times when the Bay Bridge would have to be closed for large-scale construction efforts. The annual presentations were discontinued after 2009 due to lack of participation. Per legislation, quarterly reports continued to be published and distributed.

Failing to officially report to elected officials and the public had caused problems for the project. The TBPOC put forward and kept a regular process of updating audiences with monthly and quarterly reports on the progress of the project. The project was successful when information was communicated early and often. The annual presentation to elected officials that the TBPOC discontinued could have supported overall project understanding by providing a mechanism to keep elected officials and other audiences current on project progress.

The governing body should recognize the importance of working with the project team and they should be engaged and regularly informed. On a mega-project it is essential that Agency and the Governor's Office should be synchronized with the project team. The Director needs a talented program manager, project manager, and public information officer who instill trust and keep each other informed. When multiple agencies are engaged, a small group representing each layer of government should remain in contact and keep their agencies informed. The Governor's office should remain involved throughout project completion as mega-projects are highly visible.

Communications Plan and Sharing Information with the Public and Stakeholders

COMMUNICATING WITH STAKEHOLDERS, THE PUBLIC, AND THE MEDIA

The TBSRP risk management team identified challenges associated with communication that could affect cost and schedule of the East Span project.

To address communications risks a CPT was created consisting of staff from each of the TBPOC agencies. The CPT met regularly and kept up with project staff to develop and implement a comprehensive communications plan designed to provide transparency, educate stakeholders, and improve public safety for the project.

The CPT mitigated communications risks and addressed public safety challenges for the project following established protocols. While the CPT was successful for a majority of the project, media reports generated questions on the safety and quality of the bridge construction. Once these messages were communicated in the media, they proved to be difficult to correct.

The CPT was created to address communication challenges that could affect project schedule, budget, and public safety. Beyond these concerns, good public information practices supported opportunities to improve design and construction methods for the project. By adapting the communications strategy used on the West Approach project that allowed the Bay Bridge to be closed, the project designers for the East Span project were able to replace the approach to the Yerba Buena Island (YBI) tunnel instead of retrofitting the 70-year-old structure.

BRIDGE TOURS/SITE ACCESS

Regular tours of the Bay Bridge construction site were made available through the project's Public Information Office (PIO). Elected officials, project stakeholders, industry members, students, and the media were allowed access to learn about and stay abreast of the project's progress.

Providing access to the construction site created greater transparency and allowed audiences to better understand the scale and magnitude of the project. Although access and information were made readily available during the TBPOC era, elected officials, the public, and the media did not always visit the site or attempt to use the information to understand the project. When these provisions (access and information) were used by officials and the media, and informed decisions were made, the resulting decisions and involvement were instrumental in supporting the project team to achieve the desired goals of delivering a quality project on time and budget. The complexity of the project made it difficult for people to fully comprehend unless they made an effort to study or visit the project.

COMMUNICATION TOOLS AND TECHNOLOGY

The CPT developed a series of new and innovative tools to communicate with the public. The following are three key examples:

1) Media Bar – Most of the TV stations in the Bay Area were using different formats for their video. A technical meeting was held at the Bay Bridge PIO with IT people from each station to determine how best to provide the stations with video footage. The CPT then built a website where broadcast quality 5 to 15 second video clips, and print ready imagery would be available to the media and open to the public. The content was curated by subject and relayed directly to the media online and in the field with disks and flash drives. By providing these materials the quality of the media stories improved as the accuracy of the visuals helped the media explain what was happening.

2) Google Earth – The CPT worked directly with Google to place a 3D model in the Google Earth environment. A new convention was developed that showed constructed portions of the bridge as solid and future elements as transparent. The model was regularly updated so the public could review bridge construction and explore the design on their own. By having a model of the bridge available to the public to study on their own they started to understand the structure better and believe it would be completed. It also provided an easy to understand update on how much of the bridge had been constructed at any given time.

3) Bay Bridge Explorer – To better inform motorists that were more likely to visit mobile application stores than watch the nightly news, the CPT created an interactive simulation that allowed motorists to drive new bridge alignments before they were put in place. This also allowed the public and the media to explore the bridge and receive project information in a new way.

These innovative tools were developed and used for the first time on the Bay Bridge and helped audiences connect to the project. The new tools were effective getting project information to audiences during a time when the communications industry was changing. The media bar made professional quality project footage and graphics available for the media's stories and improved not only accuracy but tone as well. Google Earth allowed users with an Internet connection to take their own virtual tour of the job and see how progress was going.

Examples of Communication Efforts

IMPLEMENTING COMMUNICATIONS PLAN FOR BAY BRIDGE FULL CLOSURES

The Bay Bridge is the backbone of transportation in the Bay Area carrying an average of 280,000 vehicles per day. When the bridge is closed, it adversely affects the local and statewide economy and public safety. The project was originally planned with a "no closure" mandate, however, the seismic construction work and its potential impacts on the traveling public required the bridge to be closed.

The project team for the West Approach to the Bay Bridge devised a strategy that would provide unprecedented communication throughout the region and state to support the closure of the Bay Bridge. The team's approach was successful and allowed the bridge to be closed with only minor traffic issues. When the TBPOC was formed, the CPT incorporated and refined this approach to handle the seismic work for the East Span of the Bay Bridge. The communications plan involved coordination with numerous regional agencies, an outreach plan for elected officials, a media plan, and a public outreach

plan. The media were informed early and often about the planned closures. (Reference Appendix D for an example.)

By working closely with the contractor, stakeholder agencies, elected officials, the surrounding community, and the media, the project team was able to devise a way to change the mandate that the Bay Bridge could not be closed. The successful implementation of this first bridge closure allowed for future bridge closures on the project in 2007, 2009, and 2013. These closures allowed the TBSRP to maintain public safety and overall project schedule. The comprehensive communications plan strategy was modeled by other State projects such as Interstate 5 in Sacramento and the 405 freeways in Southern California.

FAILURE OF THE SAS A354 BD RODS

On the top of SAS Pier E2, 32 galvanized high-strength rods failed and a retrofit was needed to replace the intended performance of the rods. Having an issue of this nature occur so close to the opening of the bridge had a negative effect on public confidence, elevated project costs, and significantly increased the potential for delay of the bridge opening. The TBPOC's ability to respond and communicate information to the public and the media in a timely manner was critical.

Media briefings were held at the MTC office directly after BATA commission meetings where updates were given from the project team.

Based on best practice, the media had come to expect regular briefings in the field from the project team speaking with one unified voice when issues came up regarding the bridge. This approach had regularly been used and proven successful. As more information became available from project staff and third-party experts (see Quality Management, p. 47), the opening date of the bridge became questionable. Repeated media stories questioning the safety and quality of the bridge affected public confidence and increased political pressure on the project team.

While the BATA commission briefings were appropriate to update elected officials, the periods between the briefings were not in line with established protocol. Having the media wait to receive updates at BATA commission meetings instead of having the project team provide timely responses in the field affected transparency and trust with the media. Untimely responses to the media resulted in reporters turning to unofficial sources to report on the issue in order to provide news to the public. Technical and management professionals had to set aside extra time to deal with increasing public relations issues rather than focus on their direct project responsibilities.

EMERGENCY BAY BRIDGE CLOSURE FOR PERMANENT EYEBAR REPAIR

In order to construct the new East Span in the same footprint as the original without interrupting traffic, a detour had to be built. In 2009, when the bridge was closed to implement the detour, a 6-inch crack was found on an eyebar that had to be repaired before the original bridge could reopen. The repair was made and then approximately one month later during a windstorm it failed and fell into traffic damaging three cars and causing an emergency closure of the bridge. Loss of public trust in Caltrans engineering and maintenance capabilities due to this failure had the potential to affect the new bridge project.

The CPT immediately implemented an emergency protocol procedure that informed stakeholders of the issue and created a Joint Information Center (JIC) at the project PIO in

Oakland. The JIC remained open for the media to access throughout the entire time the bridge was closed for the permanent eyebar repair. Regular media updates were scheduled near the work that included site visits to allow reporters to view progress first hand. Graphic representations of the modifications being made and video footage of the repairs underway were distributed in multiple formats to ensure information was consistent and understandable.

Using an established emergency communications protocol allowed CPT members to swiftly and effectively respond. Keeping the JIC open during the entire time and allowing the media open access helped them do their job successfully. This improved information dissemination, provided transparency, and preserved trust.

STEEL TENDONS ON THE SKYWAY CONTRACT

A small portion of the steel post tensioning strands inside the concrete Skyway showed corrosion during construction. The issue was identified, analyzed, peer reviewed, and mitigated years before the media wrote a story about it. Information on the issue was difficult to break down into sound bites needed to answer the press. The issue was technically complex and needed more time to explain than media stories generally allow.

Project engineers participated in a public meeting at Pier 39 in San Francisco that covered the topic. Exhibits of the key technologies and practices used to address the problem (such as the borescope video investigation) were presented so the audience could see how they worked first hand. The meeting was filmed and used as a resource for a series of videos available on the Bay Bridge project website that made the issue easy to understand. The meeting and web videos were produced and made public before a story was written.

By giving project engineers the time and opportunity to discuss the problem in a public setting and then capsulizing the discussion in a set of web videos for the public, transparency was provided in a way that the public could access and understand.

Summary

People working together in teams make a difference. To manage expectations on a mega-project, qualified and dedicated professionals, respected outside expertise, robust communication, and risk management teams are needed from beginning to end to deliver the project. An open executive decision-making process is necessary to improve transparency. Readily available project documents can help maintain public trust. When they cannot be produced suspicion sets in. Top-level project decision-making meetings should be open to the public. Critical project information must be communicated in a clear, concise, and timely manner internally to ensure good decision making and externally to provide clarity and transparency. Mega-project owners should also consider innovative delivery methods to communicate critical information such as project status and public safety. Making an extra effort beyond mandated or legislated reporting to keep elected officials up to date with current and projected status of the project is critical to decision making that affects project delivery. Managing expectations on a mega-project is best accomplished when the communications team is empowered to speak with one voice from the project site representing the direction of the governing body throughout the entire life of the project.

PROJECT DELIVERY METHOD

This section focuses on the lessons learned for the project delivery method implemented on the East Span project.

Lessons Learned

The following are overall highlights of lessons learned that are to be considered for future mega-projects. Contributor input presented as common themes was received through interviews on what worked and what may be improved as it relates to the East Span project.

1. During the planning phase of a project, the mega-project program management team should assess the merits of the various project delivery methods. There is a varying balance of schedule, risk, and design definition among the various delivery methods of Design-Bid-Build (DBB), Construction Manager-General Contractor (CMGC), Design-Build (DB), and Public-Private Partnership (PPP). A critical success factor is assessing the balance of the key project values of schedule, risk, cost, and design definition, and the selection of the appropriate project delivery method or combination of methods that best meets the specific needs of the project.

   N Caltrans divided the East Span corridor into multiple construction contracts and applied DBB to select the contractors for each of the contracts as required by the State of California procurement statutes. Each selected contractor was based on the lowest responsible bidder for that contract with mixed results. The overall program would have benefitted if there were flexibility to select the project delivery method that best suited each contract.

2. On mega-projects with multiple construction contracts, the scope of each of the construction packages must be vetted through a risk management process prior to starting substantial design efforts. Factors to consider include the size of each construction contract, construction method, desired construction sequence, and bonding capacity of potential bidders. High risk items such as foundations should be moved off the critical path. This approach can avoid or reduce redesign efforts resulting from rescoping individual construction contracts after the final design has been started.

   N The East Span project team incorporated scope changes to individual design packages well after the start of design. While the changes to the individual design packages benefited the overall program, making those scope changes after substantial design had already been completed contributed to higher design costs.

3. There can be significant benefit to a mega-project by engaging contractor and fabricator expertise early in the project development process. Contractor input provides the designer with useful information regarding the constructability of the project, and assists the designer in developing a design that is buildable and minimizes design changes during construction.

LEGEND
(Common themes from contributor input)

- ☑ Positive
- N Neutral
- ☒ Negative

N On the East Span project, Caltrans engaged potential contractors through the contractor outreach process to get their input before each of the contracts went out to bid. However, the DBB process limited the level of direct contractor engagement. Even though the contractor outreach provided useful information, having more direct participation by the contractor and fabricators during the design process would have contributed to an even more complete design and minimized the additional costs from the design changes required during construction.

4. Due to the complexity of mega-projects, designs should be developed in 3D using building information modeling (BIM) design software. The 3D design process can support integration of the different design elements reducing potential of design errors, and can be used to directly generate construction drawings. The project can be virtually constructed through the use of 4D models (3D model plus construction schedule) to identify design and construction conflicts during the design phase instead of the construction phase.

   N On the East Span project, the design began in the late 1990s and was developed in 2D using standard computer-aided design software. As the project design progressed over time, there were improvements in technology and designers' familiarity with model-based design, which resulted in the later projects being designed using BIM software.

5. Due to size of mega-projects, it is important to engage small businesses, to the extent practical, to strengthen the ties of the project to local community and further enhance the economic development of the area.

   ☑ The Toll Bridge Program was successful at promoting small business participation by employing a relationship-based partnering model to actively connect prime contractors and local small businesses. The program also provided business-related training workshops.

Background

Multiple Construction Contracts

The East Span project was constructed using multiple construction contracts procured through a DBB process. The process followed State of California statutes for procuring construction work with the lowest responsible bidder being awarded the contract. There were close to 20 different construction contracts delivered under the DBB procurement method.

Design-Bid-Build Procurement Method

The new East Span used the DBB project delivery method, which is common practice on Caltrans projects and required by statute. Under the DBB method, a designer develops the construction drawings and specifications for the owner. Once the design is complete and the bidding package assembled, the owner advertises the bid package for contractors to prepare bids for the work. The owner selects the contractor based on the lowest

responsive bid. The contractor is responsible for building the project according to the contract documents.

At the time when the East Span project began, the State of California required Caltrans to procure construction contracts through the DBB process. According to the State Contract Act, Caltrans is obligated to award contracts to the lowest responsible bidder on a full and complete set of plans and specifications. The separation of procurement for design and construction, where designers are selected by qualifications and construction contracts are selected by competitive low bid by DBB, has generally served the State well. Even though the State has started to procure projects on a limited basis using alternative methods such as DB and PPP, all the many Bay Bridge contracts were procured through the DBB process.

Discussion

Project Delivery Benefits on the East Span Project

DESIGN-BID-BUILD GIVES OWNERS THE BRIDGE IT WANTS

On the East Span project, maintaining control over the overall design was of high importance to the owner. Given that the primary values for the project were meeting lifeline seismic criteria and aesthetics, DBB was the delivery method that ensured the owner had control over the details that supported those goals. By contrast, if the project had been delivered using DB, the contractor would have provided a project that met the performance specifications and the owner would not have had control over the design details, or would have needed to specify design details in the DB procurement package. Given the challenging design requirements, the owner was better able to ultimately provide the bridge requested by the region using DBB procurement method. This was particularly important for the complex SAS bridge where owner input and guidance during design and construction was critical to the successful and efficient final product.

MODELING AND FULL SCALE MOCK-UPS REDUCES RISK

The lifeline seismic criteria definition meant that after a seismic event, the bridge is immediately available for emergency vehicles, and can be returned to public service without rebuilding the bridge. Therefore, the seismic performance of the design had to be thoroughly understood and predictable. To achieve this through the design process required extensive computer modeling using the latest structural analysis software for the many components of the bridge. The shear link beams on the tower, the foundation piles, and the hinge pipe beams are some of the innovative structural design incorporated into the Self-Anchored Suspension (SAS) span. These were modeled to assess their individual and collective performance of the structural system during a maximum credible event. The goal of this modeling was to capture the anticipated performance of the bridge and to verify the design. This level of design performance verification and understanding by the owner was best supported by the DBB process.

Full-scale mock-ups were also developed for various elements of the SAS design to help verify and improve the design of the SAS span. Full-scale mock-ups of the box girder were developed to test full-scale forces and measure displacements as well as assess the constructability of the members. It would have been very difficult to achieve this in a DB environment. Putting requirements for full-scale mock-ups in a design build contract would increase unknowns in design and would have made it more difficult for

contractors to price the project. The full-scale mock-ups allowed the design team to assemble particular steel connections on the SAS span that could possibly be challenging to the fabricator. The full-scale mock-ups reduced construction risk and demonstrated to the fabricator how best to assemble some of the more difficult connections before the fabricator went into production of those elements.

Project Delivery Challenges on the East Span

INTEGRATING MULTIPLE CONTRACT SCHEDULES WITHIN THE OVERALL CORRIDOR SCHEDULE

Given that there were multiple construction contracts being constructed at various times, the schedule coordination could have been analyzed more thoroughly during the design phase. In its "race against time" to achieve seismic safety, the Toll Bridge Program Oversight Commitee (TBPOC) was continually looking at ways to optimize the overall schedule, and maintaining and accelerating the schedule drove the major program decisions. However, changes to the overall schedule required multiple contract changes given that each of the construction contracts had its own contractual schedules. To achieve seismic safety as quickly as possible, the Toll Bridge Seismic Retrofit Program (TBSRP) created the corridor scheduling team. The corridor scheduling team consisted of schedule representatives from all of the three agencies. The team provided monthly reporting to the Toll Bridge Program management. As issues arose, the corridor scheduling team evaluated various options and provided recommendations to mitigate schedule impacts.

The corridor scheduling team faced challenges as they were not directly involved in the scheduling decisions for each of the individual contracts. Instead, each of the contracts had its own contract scheduler that reported directly to the respective resident engineer. The program may consider having a corridor scheduling manager in which the various individual schedulers for each contract would report to, or collaborate with, the corridor scheduling manager, which would allow for scheduling decisions to better support overall program scheduling goals.

MORE EARLY CONTRACTOR INPUT ON THE DESIGN NEEDED

One area where the complexity of the project challenged the Caltrans project delivery experience was in the area of constructability reviews during design. Although DBB gives the owner more control over specific design features, the designers did not have access to construction professionals with experience on the bridge types being designed. The design would have benefited from input by contractors with experience building large steel bridge structures in adverse conditions. On a typical Caltrans project, experienced Caltrans construction staff are brought in to perform a constructability analysis of the design with comments incorporated into the final design. On the East Span project, Caltrans did not have the in-house expertise for the bridge type being proposed to provide a comprehensive and thorough constructability review. As the project progressed, it became clear there were gaps in Caltrans knowledge with regard to certain construction activities. As a result, Caltrans took a number of actions to help fill in the gaps, which greatly benefited the design.

Demonstration Projects

To gain valuable constructability and design performance criteria data for the bridge design, Caltrans executed demonstration projects to help resolve some unknown

technical or constructability issue. One example was the pile demonstration project which undertook installation methods of the proposed large diameter piles and to understand the construction process within the marine environment. Three full-scale piles were driven in the Bay adjacent to the proposed new East Span location and the results from this demonstration project informed the final design for the bridge foundations and resulted in more complete and buildable specification requirements.

Contractor Outreach

Another approach Caltrans took to facilitate contractor involvement in the design development was to hold contractor outreach meetings to allow contractors to comment on the design before it was put out to bid. This allowed interaction with the contractors who would be potentially building the project, and allowed Caltrans to have access to construction expertise for this scale of project. The input from the contractors provided the designers with information about how the project might be constructed. The contractor outreach provided valuable insights regarding potential construction methods, which the designers used to improve their design.

DESIGN CHANGES DURING CONSTRUCTION

Due to the complexity of the project, additional design effort was needed during construction. Design changes were made during construction to mitigate schedule risk and in some cases to accelerate the schedule. For a DBB project, this typically leads to increased costs to the contract and shifts the schedule risk from the contractor to the owner. Since one of the TBPOC goals for the East Span project was to compress and accelerate the schedule to achieve seismic safety, the TBSRP made the decision to make changes to the design during construction to reduce risks to the project schedule.

Collaboration at the Working Drawing Campus

The designers and Caltrans construction collaborated with input from the contractor on the revisions of design features to mitigate risk, which were then issued to the contractor to build. This collaborative process worked well and was facilitated by all participants being co-located at the working drawing campus at the construction site. Through collaboration with the contractor, design revisions were generally developed quickly enough to avoid delaying the contractor. On the DBB project, the contractor was able to work with design changes made during construction because the changes were coordinated early enough so as to not delay their schedule.

Owner Assumes Risk on DBB Contract Change Orders

The design changes made by the owner under a DBB contract presented no risk for the contractors since Caltrans assumed the scope and schedule risk for those contract changes. Even though on a number of the Bay Bridge contracts where design changes were being made to mitigate risk, the owner had to assume the schedule risk from the contractor associated with those changes. By delivering the corridor through the use of DBB with extensive use of contract change orders, Caltrans was able to retain control of the scope of the project design but then assumed more of the construction and schedule risk when the contract was changed. Even so, the DBB process was appropriate for a majority of the Bay Bridge contracts as the owner retained control over the design, which gave them latitude to make design changes that could help mitigate schedule risk.

Small Business Involvement

In July of 2006, the Toll Bridge Small Business Program was created to promote and enhance contracting opportunities with disadvantaged, small, and disabled veteran's business enterprises on the toll bridge program. A small business manager was appointed to implement a relationship-based partnering model that would actively connect prime contractors and local small businesses. The small business manager was located in a field office on the San Francisco-Oakland Bay Bridge (SFOBB) East Span campus at Pier 7 in Oakland.

The TBSBP offered the following programs to help foster partnering and small business involvement in the toll bridge program:

- Contractor technical assistance (Technical and capacity building assistance)
- Training (Workshops on bonding, insurance, bidding)
- Business practices support
- Contractor outreach events (Pre-contract award events)
- Identification of small business opportunities
- Putting small business in touch with prime contractors
- Small Business / Disabled Veteran's Business Enterprises (DVBE) certification support

SERVICES

The Small business outreach efforts were heavily attended. At bidder conferences, prime contractors were provided with lists including over 300 local businesses (small business, DVBE) that had successfully performed on toll bridge construction contracts. By June of 2013, payments in excess of $259 Million to over 330 small and disadvantaged businesses had been made. Approximately $198 Million (78%) of those payments were paid to local firms.

The primary lesson learned is that by employing a relationship-based partnering model to actively connect prime contractors and local small business, it is possible to effectively complete project work while improving the local economy, engaging the community, and increasing skilled labor capacity.

Summary

The TBSRP delivered the multiple construction contracts of the East Span project using DBB procurement method for each of the contracts. There were benefits and challenges using the DBB method for a complex mega-project such as the East Span project. Because the project was being delivered by DBB, the design was developed by the owner for each of the contracts and the contractor chosen was the lowest responsible bidder on each of the contracts. While a DBB delivery approach provided Caltrans control of the design details, having more in-house construction-related expertise during the design development could have benefited the project by minimizing potential design revisions during the construction phase as well as potential schedule risks. Although not available when Caltrans began contracting for the East Span project, future mega-projects should consider and evaluate alternative project delivery methods that best fits the project needs.

QUALITY MANAGEMENT

This section focuses on how the Toll Bridge Seismic Retrofit Program (TBSRP) placed quality as one of its highest values on the East Span project. Quality was implemented at all management and staff levels.

Lessons Learned

The following are overall highlights of lessons learned that are to be considered for future mega-projects. Contributor input presented as common themes was received through interviews on what worked and what may be improved as it relates to the East Span project.

1. The implementation of quality for all parties on a mega-project requires management commitment, adequate resources, and good working relationships amongst the owner, contractor, and fabricator throughout the entire life of the project.

   ☑ Caltrans, its agency partners, and the prime contractors placed quality as a high priority by meeting regularly to address quality-related issues. When needed, resources were added to provide support to implement fabrication quality assurance/quality control (QA/QC) processes.

2. Mega-project owners should have quality assurance (QA) and testing staff involved throughout the life of a project to assist during design and construction phases.

   ☑ Caltrans Materials Engineering and Testing Services (METS) provided QA services and source material inspection during fabrication and construction. METS offered technical input during the development of the design specifications.

   ☒ Although METS did provide some input during construction, the project could have benefited from more METS participation and a formalized role in the design phase.

3. Third-party expert panels such as the Seismic Safety Peer Review Panel (SSPRP) or the QA/QC Expert Panel that provide guidance on complex technical issues and demonstrate particular methods being employed on the project are appropriate and consistent with the current state of the practice are important to establish early on and maintain throughout the project.

   ☑ Both the Seismic Peer Review Panel and the QA/QC Expert Panel consisted of highly credentialed experts that helped resolve important issues for the project.

   ☒ Given the experience and expert qualifications of the SSPRP the project may have benefited by involving them in issues beyond seismic performance such as the structure's overall lifespan and future maintenance.

   ☒ The QA/QC panel, which was formally assembled during fabrication, should have been assembled earlier in construction prior to fabrication and given direction to work together to resolve issues for the betterment of the project.

LEGEND
(Common themes from contributor input)

☑	Positive
N	Neutral
☒	Negative

4. Mega-project owners should consider incorporating detailed fabrication processes in the contract documents to further define quality best practices if there is a potential for overseas fabrication.

   ☑ The TBSRP implemented an incremental acceptance process (i.e., Green Tag) in China and a robust database that contained all fabrication data collected, which could be easily accessed electronically, to improve QA/QC processes for the Self-Anchored Suspension (SAS) project.

   ☒ These processes were incorporated during fabrication and should be incorporated earlier in design specifications for future projects.

5. If any element of a mega-project is being fabricated in a foreign country, management attention, resources, and time should be allocated to developing cultural awareness practices for expat staff.

   ☑ Caltrans committed management attention and resources to cultural awareness during the fabrication of the SAS in China, which provided great benefit to the project.

Background

QA/QC processes practices for the East Span project require management involvement through design, construction, and fabrication. The following terms are defined below:

Quality The degree to which the project and its components meet the owner's expectations, objectives, standards, and intended purpose, determined by measuring conformity of the project to the plans, specifications and applicable standards. (Construction Management Association of America, 2011, p. 5)

Quality Assurance Evaluating overall project performance on a regular basis to provide confidence that the project will satisfy the relevant standards.... (Project Management Institute (PMI), 1996, p. 83)

Quality Control Performing quality control involves monitoring specific project results to determine whether they comply with relevant quality standards and identifying ways to eliminate causes of unsatisfactory results…(PMI, 1996, p. 83)

Discussion

Managing Quality

METS

As part of managing quality for Caltrans projects, the METS team conducted specialized laboratory and field testing, performed inspections, and provided technical expert advice involving materials and manufactured products. METS also provided technical expertise for the development of statewide standards, guidelines, and procedure manuals. These services and processes were implemented throughout the East Span project, including overseas

suppliers and fabrication shops. METS performed source inspection of miscellaneous items and fabricated products such as suspender rope tensile testing, S-wire tensile testing, full-length anchor rod testing, rebar hoop splice testing, concrete cylinder compression tests, and radiographic rebar testing that were specific to the East Span project. (Caltrans Materials Engineering and Testing Services, 2014)

SEISMIC SAFETY PEER REVIEW PANEL

The SSPRP was an independent panel of highly credentialed experts who provided guidance and oversight on the East Span project with technical and quality issues during planning and design development as well as construction.

Current and past members of the SSPRP included:

- Frieder Seible, Ph.D., Chair of the SSPRP, Structural Engineer and Dean Emeritus at University of California, San Diego
- John Fisher, Ph. D., Structural Materials and Systems Engineer and Professor Emeritus at Lehigh University
- I.M. Idriss, Ph.D., Geotechnical Engineer and Professor at University of California, Davis
- Joseph Nicoletti (until 2011), former Chair of the SSPRP, Consulting Structural Engineer
- Gerald Fox (until 2007), Bridge Design Engineer
- Ben Gerwick (until 1995), Construction Engineer and Professor Emeritus at University of California, Berkeley

Each of the experts above brought in his subject matter knowledge to help the team address complex issues associated with the East Span project. As a consideration, future mega-projects should determine whether to include an architect subject matter expert as part of the peer review panel, if aesthetics and architecture are identified as values on the project.

QUALITY ASSURANCE/QUALITY CONTROL EXPERT PANEL

The QA/QC Expert Panel was formed to further improve and place additional focus on the challenging fabrication of the east end of the SAS.

The panel included the following members:

- Don Rager, Chair of the American Welding Society Code Committee for Structural Steel Welding
- David McQuaid, Chair of the American Welding Society Code Committee for Bridge Steel Welding
- John Barsom, Ph.D., Fracture Mechanics Specialist and Metallurgist
- Alan Cavendish-Tribe, Professional Welding Engineer

The panel was tasked to work collaboratively with the project team (owner and contractor) to assess and provide recommendations regarding welding processes and procedures of the Orthotropic Box Girder (OBG) steel fabrication in China during the fabrication phase. These collaborative efforts are documented in the QA/QC report (Caltrans/ABF, 2011).

The positive working relationship between the contractor and the TBSRP allowed the effectiveness of the panel members to perform their task and positively impact quality as well as the fabrication schedule.

QUALITY REQUIREMENTS IN THE CONTRACT DOCUMENTS

During the development of design technical specifications, Caltrans supplemented the existing standard specifications with special provisions tailored to the needs of the project. Input and review from in-house designers, METS, and industry experts were solicited and their inputs were included in the specifications. Lessons learned and best practices from past Caltrans bridge projects, such as the Carquinez Bridge, were incorporated into the documents.

Managing Quality for Overseas Fabrication

CO-LOCATION OF METS AND CALTRANS CONSTRUCTION IN CHINA

Caltrans construction and METS staff were co-located in China at the fabrication facility to streamline reviews and response times and enhance communication efforts between the owner, contractor, and fabricator. This co-location environment helped progress the SAS fabrication while maintaining quality and minimizing fabrication delays.

MULTIPLE LAYERS OF INSPECTION WITHIN THE SAS QA/QC PROCESS

The QA/QC process in the overseas fabrication shop had multiple layers of inspection and oversight. The QC inspection was performed by both the fabricator and the prime contractor. QA was performed by both the prime contractor and METS. Oversight was performed by the BATA oversight consultant, the QA/QC Expert Panel, and the SSPRP.

UNDERSTANDING DIFFERENT CULTURES DURING OVERSEAS FABRICATION

A challenge to working overseas in another country with differing cultures and values required the project team working in China to receive training prior to the start of their assignment. Training should be provided for all levels of staff where the greater benefits can occur at the lowest levels. Training is a source of information that can provide a better understanding of how to interact and work with other cultures professionally and personally.

FABRICATION PROCESSES

On the SAS contract, the TBSRP implemented new processes to ensure quality was maintained during the overseas fabrication such as the database and a Green Tagging Procedure.

The fabrication database contained QA/QC data of all fabricated material performed in the SAS overseas fabrication shop and was implemented after the start of fabrication. Although this database was a useful and effective tool, the project would have received more benefits if implemented earlier. On future mega-projects, the contract specifications should include the database requirements and should be implemented by the start of ordering material and fabrication.

The TBSRP implemented QA improvements for the overseas steel fabrication. Improvements included increasing welding report requirements and implementing the QA database and a physical tagging procedure (Green Tagging Procedure) for fabricated assemblies. The tagging procedure in conjunction with the database system established a process that tracked, verified, and documented incremental progress for fabricated subassemblies and assembly stages. These improvements to the QA process provided positive impacts to the overall quality as well as the fabrication schedule.

FABRICATION SHOP FIT-UP AND TRIAL ASSEMBLY PROCESS PRIOR TO SHIPPING OF COMPLETED SEGMENTS

ZPMC used nearly 50,000 tons of steel to fabricate the 28 steel deck sections, 19 steel cross beams and 19 steel tower sections needed for the SAS structure. In order to ensure that the sections would fit together at the project site, a trial assembly was performed to confirm that requirements were met at the fabrication shop in China before being shipped to the U.S.

SHOP AND FIELD TOLERANCES OF STEEL FABRICATION

During fabrication, weekly joint meetings were held to discuss global fabrication tolerances between the owner (designer, METS, and construction) and contractor. Agreed tolerances were then issued to the contractor to implement into the fabrication process. These early efforts mitigated potential conflicts and schedule delays in the field during the erection of these fabricated pieces. Future mega-projects should place emphasis on shop and field tolerances and incorporate them into the contract documents.

Other Examples of Managing Quality

E2 SHEAR KEY A354 RODS

The SAS project faced challenges in construction when 32 of the A354 grade BD high-strength steel rods failed on the eastern end of the span. Because this problem occurred late in construction, the issue threatened to delay the opening of the bridge. A thorough investigation of the issue was performed and a temporary solution was implemented that allowed the bridge to open on time. A permanent solution was completed shortly after the bridge opened.

Although the use of A354 grade BD rods in this application appears to have met the specifications and ASTM standards, in retrospect, it would have been beneficial, given the importance and unusual nature of their use, to have had a thorough review by third-party industry experts such as the SSPRP and a QA/QC Expert Panel at the earliest phases of the project. Although many professionals reviewed the use of these rods, a team has to be able to recognize when a particular situation calls for specialized expertise and be able to ensure that the professionals reviewing the issue have such expertise on the details of project features that are unique.

From the investigation, it was concluded that hydrogen embrittlement was the root cause for the failure of these rods. The investigation of this issue is producing important new data for the industry that can be applied to ASTM standards and can be incorporated into project specifications in the future.

SKYWAY TENDONS

A construction challenge involving cross duct grouting of pre-stressing tendon ducts that is common to segmental deck construction arose on the Skyway project in 2004. The potential for unintentionally blocking tendon ducts with excess grout from other ducts resulted in extended periods in which tendons were installed but not grouted. Protective measures had been taken during construction, including the use of specialized powder on the tendons and covers to reduce rainwater intrusion until the grout could be added. Despite these efforts in 2006, an engineer observed some evidence of corrosion.

The presence of rainwater in the tendon ducts triggered a detailed review of un-grouted ducts. Caltrans assembled a METS team to evaluate the condition of the affected tendons in more detail. They used advanced investigative and testing tools such as digital borescopes and impact-echo sonic testing to evaluate the condition of the tendons. Following METS protocol, in some cases tendons were removed and destructively tested. The SSPRP and Federal Highway Administration's (FHWA) corrosion experts participated in the investigation. It was determined that 1.5% of the tendons were impacted, and through the use of destructive testing, it was determined that those affected tendons exceeded the required tensile strength. After this extensive and thorough review of the situation it was determined that the water intrusion discovered on site would not affect the performance of the bridge.

The design and construction teams worked together to investigate and resolve this corrosion issue on the Skyway. Looking forward, when complex designs such as the steel post tensioning on the Skyway are executed, the project would benefit greatly from closer coordination between these teams throughout the building process. Joint field visits held regularly during construction would likely help resolve constructability issues efficiently while assuring that the designers' intentions are being met.

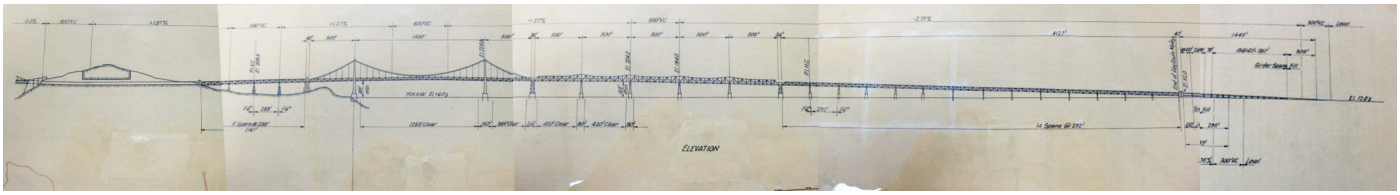
Summary

The implementation of quality for all parties on a mega-project requires management commitment, adequate resources, and good working relationships amongst the owner, contractor, and fabricator throughout the life of a project. Mega-project owners should have QA and testing staff involved throughout the life of a project to assist during design and construction phases. Third-party expert panels that advise on global issues such as the SSPRP or specific subject matter such as the QA/QC Expert Panel that provide guidance on complex technical issues and demonstrate to stakeholders that particular methods being employed on the project are appropriate and consistent with the current state of the practice are important to establish early on and maintain throughout the project. Mega-project owners should incorporate detailed fabrication processes in the contract documents to further define quality best practices if there is a potential for overseas fabrication. If any element of the mega-project is being fabricated in a foreign country, management attention, resources, and schedule time should be allocated to developing cultural awareness for expat staff of the local people in the country where the materials are being fabricated.

TECHNOLOGICAL SUBLIME

Understanding what the Bay Bridge is and what it meant to replace its eastern span may be the biggest challenge associated with the project. Technical documents, historic records (see Exhibit 5), and related media give a picture of the bridge's history. Lists of superlatives help place the project among other engineering efforts. While informative, these records do not take into account how human feelings of awe, wonder, and terror, which make up a phenomenon called the technological sublime, shaped the project. First explored by Perry Miller, discussed by Leo Marx and John Kasson, and most recently chronicled in David Nye's (1994) book American Technological Sublime, these feelings affect how humans relate to the physical environment both natural and man-made. In the case of the East Span project, the pursuit and subsequent realization of aesthetics and amenities that would connect it with the beauty and grandeur of the San Francisco Bay and its sister span, the Golden Gate Bridge, played a strong role in what the East Span ultimately became and how it was delivered. This section explores how the technological sublime affected the East Span Seismic Retrofit project and what potential lessons can be taken away from the experience.

Exhibit 5: Historic hand-drawn print dated January 1932 from the California State Archives of a Self-Anchored Suspension span for the original Bay Bridge that would have been located in the same area as the one opened in September 2013.



Lessons Learned

1. The effects of awe, wonder, and terror associated with the technological sublime should be considered when mega-projects are in the early stages of development.

   The feelings of awe, wonder, and terror experienced when taking in the grandeur of large natural monuments or massive man-made structures affect how people relate to their environment. These feelings manifest themselves in projects on issues of context sensitivity in architecture, related amenities, and aesthetics. Acknowledging early on that the technological sublime is a relevant component in project development is a necessary first step in addressing how its effects can support rather than detract from the project.

2. Embracing the technological sublime can improve project delivery and mitigate impacts to cost and schedule.

   By identifying and addressing how a project will relate to its environmental context, issues that delay project development such as architectural design and aesthetic treatments can be addressed before they cause delays. While the process for determining how

these issues are resolved may be lengthy the risk of them stopping the job later when more resources are deployed and costs are higher is worth the effort of addressing them early. It is important to determine what project features are critical and must be included. Adding amenities on after contracts have been awarded places a heavy burden on cost and schedule.

3. In order to address issues related to the technological sublime professionals experienced in architecture, aesthetics and social setting should be engaged and project staff should be educated in the values of context sensitivity for projects.

   Without experienced professionals and staff to identify, address, and implement decisions related to the technological sublime its effects cannot be used to improve the project and its environment. Engineers, administrators, and other decision makers should be provided with appropriate training to understand how their decisions ultimately impact the environment, resources, and legacy of a project.

Background

Interviewing industry and project professionals was the primary method for researching this Lessons Learned Report. Although there were many different perspectives, the unifying elements in these discussions were the sheer size and complexity of the project and that having the right people involved at the right time made a difference. Given that many different types of professionals played key roles in delivering the project and that complexity due to its size and design ran through every step in the process, how humans perceive the project is important to understanding what decisions were made throughout its development and construction. Creating a sense of awe and wonder that an individual might associate with sublimity seems at odds with the terror created by the destruction witnessed following the 1989 Loma Prieta earthquake that was the primary cause and justification for rebuilding the span. The first project report done by the Governor's Board of Inquiry back in 1990 was called "Competing Against Time" and a sense of urgency surrounded the effort to provide seismic safety to motorists crossing of the bay.

THE TECHNOLOGICAL SUBLIME

The Oxford dictionary published the following definitions for the words technological and sublime online:

Tech•no•log•i•cal

1) 1. Of, relating to, or using technology.

Sub•lime

2) 1. Of such excellence, grandeur, or beauty as to inspire great admiration or awe

The term technological sublime was originally coined by the early American historian Perry Miller (1965) in his book The Life of the Mind in America. Others such as Leo Marx and John Kasson touched on the subject, but it was Nye's (1994) book American Technological Sublime that explored the concept in depth. Nye tapped the works of Edmund Burke and

Immanuel Kant to help define the immense concept of sublimity. He then went on to explore how the feelings of awe and wonder that humans experience related to grand objects in the physical world related to the development of American works and endeavors such as bridges, electrical grids, and rocket launches among others. The feeling of terror related to smallness when in the presence of sublime objects like bridges was also defined as an integral element of the technological sublime.

More recent authors such as Karen Trapenberg Frick, Ph.D., who wrote her dissertation on the new Bay Bridge have associated the technological sublime with mega-projects. In an article entitled "Pursuing the Technological Sublime: How the Eastern Span of the San Francisco-Oakland Bay Bridge Became a Megaproject" posted on the University of California Transportation Center's website Frick explores the relationship of the technological sublime and the development of the East Span. She also makes more general observations and recommendations for how mega-projects might address the technological sublime.

THE EAST SPAN TECHNOLOGICAL SUBLIME

IDENTIFYING THE TECHNOLOGICAL SUBLIME

The mission to provide seismic safety with a new East Span structure was augmented with the desire to make that structure relate to the identity of the region it served after early Caltrans proposals for a simple concrete viaduct skyway span were rejected by the media and the public and referred to negatively as "a freeway on stilts." The State then wanted the region to choose (and pay for) any aesthetic or other amenities beyond what a skyway would offer. Because the project was accelerating to beat the next big earthquake, the process to make these decisions was accelerated as well and ultimately the decision making took longer than scheduled. The State wanted to move swiftly to provide a safe crossing of the bay. The region wanted such a massive impression as a bridge across its signature amenity (the San Francisco Bay) to relate to its context.

When the State initially proposed building a spartan concrete viaduct, the region was offended and refused to accept the structure. Public debate ensued until Governor Pete Wilson invited the Metropolitan Transportation Committee (MTC) to conduct a public process to determine what bridge would be built. The process would address regional interests such as bicycle access, architecture, and aesthetic concerns such as lighting and color. A Bay Bridge Design Task Force (BBDTF) responsible for identifying the region's preferred span and an Engineering and Design Advisory Panel (EDAP) made up of engineers and architects tasked to assist them were created. The region was still feeling the effects of the Loma Prieta earthquake and the Caltrans mantra of "competing against time" before the next big earthquake was resonant. If the State would have addressed these issues substantively and embraced the region's concerns in the original proposal, then a significant amount of time and resources could have been available to address other issues.

USING THE TECHNOLOGICAL SUBLIME TO IMPROVE THE PROJECT

The replacement for the eastern span of the Bay Bridge was designed to a new bridge building criteria called lifeline, which would require the structure to perform at higher levels than previously existed. In order to achieve this performance new seismic features would have to be innovated, tested, and constructed. The process to do this was costly and time consuming but necessary. The common perception is that by selecting the Self-Anchored Suspension (SAS) with its signature catenary form project costs escalated a magnitude higher than would have been the case with the other structures such as

a skyway bridge with a signature "cable suspension" span. While the ultimate cost of the overall East Span project certainly was higher than the other alternatives under consideration, in the end it was not the SAS bridge type that significantly increased this project's cost upwards. Other external elements, not associated with the SAS bridge type, had the greater impact on the cost increases such as the land acquisition on the Yerba Buena Island alignment, insurance, and bonding costs associated with 9/11 and project scope changes. Empowering the BBDTF to work with the EDAP and participate in a process that would identify the SAS as the regional preference addressed issues of context sensitivity related to the technological sublime and allowed the project to move forward after it was held up in public debate.

ADDRESSING THE TECHNOLOGICAL SUBLIME REQUIRES EXPERIENCE

When the SAS went out to bid in 2004, only one contractor submitted an estimate. The bid was almost double of what was estimated and could not be awarded. During this time the design was debated again and estimates for completing the job with a skyway viaduct or cable stay bridge were generated. Although these structures typically cost less than an SAS, the project had moved forward, the environmental work had been completed, and foundations were under construction for the SAS. It is unlikely that any other bridge type could have replaced the SAS at that point in time that could be delivered in less time and for less cost. The choice to replace the SAS design would also have abandoned all of the work performed with the regional community by professionals experienced in issues with the technological sublime.

Assembly Bill 144 was passed in July of 2005. It mandated that the SAS would be built and provided the funding and oversight structure to ensure project delivery. The SAS was then rebid, this time with other competitors participating, and finally awarded to the American Bridge / Fluor Enterprises, Inc., Joint Venture. The American Bridge team was the sole bidder on the SAS contract originally and the contractor that built the original Bay Bridge. Their perseverance in pursuing the SAS contract and experience building the original span and other American icons such as the Chrysler Building in New York coupled with their partner Fluor Enterprises' experience on mega-projects around the world meant that they were likely to understand the challenges of the technological sublime in construction.

Opportunities Going Forward

The California Department of Transportation (Caltrans) is currently going through a period of self-analysis and internal improvement. In 2012, Caltrans completed a program review that solicited internal and external suggestions for improving the efficiency and effectiveness of Caltrans operations. A separate internal review was also commissioned to be performed by the State Smart Transportation Initiative (SSTI), a non-profit analyst group from the University of Wisconsin, which was completed in January 2014. Caltrans is embracing and is in the process of incorporating many of the suggestions found in these reports. Caltrans' effort extends to rethinking its core mission, vision, and goals. While these reports were thorough and full of suggested improvements, they did not evaluate specific projects Caltrans delivered for best practices. The reports therefore missed the chance to analyze how the Toll Bridge Program inside Caltrans was performing and exceeding some of its suggestions on the East Span project in areas such as systems management, communications, and innovation or how it expedited environmental processes providing multiple benefits. Another possible effect of constraining these reports from evaluating projects was that issues related to the technological sublime were not examined and improvements in this area were not suggested.

The Caltrans program review and the SSTI report's thoughtful examination of Caltrans has opened a window of opportunity, to substantially improve the organization. Given this opportunity moment exists perhaps Caltrans should go deeper than the areas they examined and see how some of their projects deal with significant issues such as the technological sublime. The perception that architecture or other context sensitive elements of a project are simply amenities should be challenged. In fact, in the same way that music and art are foundational elements of any solid education, the elements of the technological sublime that connect humans to their environment are central to the type of projects Caltrans delivers and the systems it maintains. Perhaps Caltrans should go further and make sure that its teams are trained to understand how their work relates to its context. The benefits include improving cost and schedule on projects and extend into improving communities, expediting processes, and creating a proud shared legacy.

Summary

The technological sublime can be defined as the feelings of awe, wonder, and terror that an individual experiences when taking in massive man-made structures that ultimately affect how people relate to their environment. These feelings manifest themselves in projects on issues of context sensitivity in architecture, related amenities, and aesthetics. Large infrastructure projects like the Bay Bridge and other mega-projects occupy a significant amount of space in human environments such as towns, cities, and other developed regions. Consideration should be given to the contextual relationships that exist when building large infrastructure projects. Acknowledging early that the technological sublime is a relevant component in project development is a necessary first step in addressing how its effects can support rather than detract from the project.

By identifying and addressing how a project will relate to its environmental context, issues that potentially delay project development such as architectural design and aesthetic treatments can be addressed before they cause delays. While the process for determining how these issues are resolved may be lengthy, the risk of them stopping the project later when more resources are deployed and costs are higher is worth the effort of addressing them early. It is important to determine what project features are critical and must be included. Adding amenities on after contracts have been awarded places a heavy burden on cost and schedule.

Without experienced professionals and staff to identify, address, and implement decisions related to the technological sublime, its effects cannot be used to improve the project and its environment. Engineers, administrators, and other decision makers should be provided with appropriate training to understand how their decisions ultimately impact the environment, resources, and legacy of a project.

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CONCLUSION

The following characteristics are pulled from the Federal Highway Administration's (FHWA) definition of a mega-project (U.S. Department of Transportation FHWA, 2014):

- Significant cost (estimated total cost of $1 billion to $500 million or greater)
- High level of public attention and political interest
- Substantial direct and indirect impacts on the:
  - Community
  - Environment
  - State Budgets
- High skill level and attention required to manage the project successfully

These characteristics, referenced above, demonstrate that the new East Span project was indeed a mega-project. This Lessons Learned Report is a high level review of the East Span project for the purpose of sharing information on key successes and challenges in delivering this mega-project. Its overall intent is not to judge the work done but to learn from it; this is an effort to benefit future mega-projects throughout the State, country, and world.

In general, we should take away the following:

- The appropriate governance structure of a mega-project should be broadly assessed in the context of the needs of the program rather than in the context of an existing owner's organizational structure.
- The level of success of a governance structure is dependent on the individuals assigned to key responsible roles.
- A mega-project requires an organizational structure with a full-time dedicated team with clearly defined roles and responsibilities.
- The program manager needs to be empowered to make decisions and have access to top leadership in the oversight organization.
- The team needs to have strong resources, systems, and tools throughout the project and team co-location is highly recommended.
- The people who work on the project need the drive, commitment, expertise, and ability to adjust to change.
- Mega-projects should implement a formalized and comprehensive risk management program from the onset of the project, even prior to the development of the original cost estimate.
- To manage expectations on a mega-project, qualified and dedicated professionals, respected outside expertise, robust communication, and risk management teams are needed from beginning to end to deliver the project.
- An open executive decision-making process is necessary to improve transparency.
- Critical project information must be communicated in a clear, concise, and timely manner internally to ensure good decision making and externally to provide clarity and transparency.
- Managing expectations on a mega-project is best accomplished when the communications team is empowered to speak with one voice from the project site representing the direction of the governing body throughout the entire life of the project.
- On future mega-projects, consideration should be given to evaluating the appropriate project delivery method that best fits the project needs.
- Consideration should be given to the contextual relationships that exist when building large infrastructure projects.

The East Span Project Overall

The East Span project has evolved from what was envisioned in the late 1990s. These evolutions created challenges in design, management, construction, and funding. These challenges were met and overcome by its team members. The importance of the team members and their individual dedication in time and effort drove this project. On Labor Day, September 2, 2013, the East Span project was open to traffic, delivering the seismically safe lifeline corridor to the Bay Area.

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Appendix A

BILL NUMBER: AB 144 CHAPTERED
BILL TEXT

CHAPTER 71
FILED WITH SECRETARY OF STATE JULY 18, 2005
APPROVED BY GOVERNOR JULY 18, 2005
PASSED THE ASSEMBLY JULY 13, 2005
PASSED THE SENATE JULY 7, 2005
AMENDED IN SENATE JULY 6, 2005
AMENDED IN SENATE JUNE 30, 2005

INTRODUCED BY Assembly Member Hancock
(Coauthors: Senators Alquist and Torlakson)

JANUARY 20, 2005

An act to amend Sections 188.4, 188.5, 30912, 30950.2, 30953, 30961, and 31010 of, to add Sections 182.2, 188.6, 30886, 30952.05, 30952.1, 30952.2, 30952.3, 30954, 30961.1, 31011, and 31021 to, and to repeal and add Section 31020 of, the Streets and Highways Code, relating to transportation, making an appropriation therefor, and declaring the urgency thereof, to take effect immediately.

LEGISLATIVE COUNSEL'S DIGEST

AB 144, Hancock Bay Area state-owned toll bridges: financing.

(1) Existing law specifies the powers and duties of the Department of Transportation, the Metropolitan Transportation Commission, and the Bay Area Toll Authority with respect to the collection and expenditure of toll revenue from the 7 state-owned toll bridges within the geographic jurisdiction of the commission. Existing law provides for a uniform $3 auto toll on those toll bridges. Under existing law, this toll revenue, other than revenue from a $1 seismic surcharge, is deposited into the Bay Area Toll Account and is controlled by the authority. Existing law requires the department and the authority to enter into a cooperative agreement that makes the department responsible for operating the bridges and for constructing improvements to the bridges financed by toll revenues. Existing law estimates the cost for seismic retrofit or replacement work on the Bay Area state-owned toll bridges at $4,637,000,000 and identifies funding to be made available for this purpose from various sources, including imposition of a $1 seismic surcharge. Under existing law, this surcharge revenue is deposited into the Toll Bridge Seismic Retrofit Account for expenditure by the department until completion of the seismic projects and payment of the bonds issued to finance those projects. Existing law specifies a particular single cable tower suspension replacement design for the eastern portion of the San Francisco-Oakland Bay Bridge. Existing law prescribes a specified formula for paying the maintenance costs of the Bay Area state-owned toll bridges from the State Highway Account and toll revenues.

This bill would state the Legislature's findings that the amount previously identified for seismic retrofit and replacement of the state-owned toll bridges is insufficient and would identify additional funding sources of $3,600,000,000 for those projects, including revenues from an additional surcharge to be imposed by the authority, refinancing of existing bridge toll bonds, and various state funds, and would require a schedule to be adopted by the California Transportation Commission for allocation of those state

funds. The bill would appropriate $75 million of specified Motor Vehicle Account funds and $125 million of other specified funds in that regard. The bill would authorize the authority to increase tolls on Bay Area state-owned toll bridges no earlier than January 1, 2007, for the purpose of completing the seismic program and for its other obligations under this bill, and would authorize the authority to refinance bridge toll bonds. The bill would require the existing seismic surcharge to be paid to the authority and deposited into the Bay Area Toll Account, except as necessary for payment of existing bond debt, and thereafter would require the department in that regard to transfer to the authority, for deposit into that account, all revenue from the surcharge. The bill would specify a formula for sharing of any future cost savings between the state and the authority and would require the authority to be responsible for any future cost overruns. The bill would require maintenance of each Bay Area state-owned toll bridge to be funded from toll revenues upon the completion of seismic work, other than from the seismic retrofit surcharge during the period that certain bond debt remains outstanding.

The bill would require the department and the authority to amend their cooperative agreement to incorporate certain oversight and control responsibilities of each agency with respect to the seismic and other bridge construction projects. The bill would require the department to obtain the prior approval of the authority for contract specifications and bid documents and would authorize the department to include provisions to maximize the number of bidders for toll bridge seismic retrofit and replacement projects and to encourage the timely completion of those projects. The bill would also require the authority and the department to form a Toll Bridge Program Oversight Committee to review those projects. The bill would impose various risk management duties on the department. The bill would require the department to regularly report to the Toll Bridge Program Oversight Committee and the Legislature on various matters. The bill would specify the rate of overhead costs that may be charged by the department to the authority for toll bridge work. By requiring the authority to perform additional duties, the bill would impose a state-mandated local program.

(2) Existing law, until June 30, 2005, exempts toll bridge seismic projects from various requirements of the California Environmental Quality Act and the Public Contract Code.

This bill would provide that those exemptions shall continue to govern the toll bridge seismic program until that program is completed.

(3) The bill would enact other related provisions.

(4) The California Constitution requires the state to reimburse local agencies and school districts for certain costs mandated by the state. Statutory provisions establish procedures for making that reimbursement.

This bill would provide that no reimbursement is required by this act for a specified reason.

(5) The bill would declare that it is to take effect immediately as an urgency statute.

Appropriation: yes.

THE PEOPLE OF THE STATE OF CALIFORNIA DO ENACT AS FOLLOWS:

SECTION 1. Section 188.4 of the Streets and Highways Code is amended to read:

188.4. (a) Maintenance expenditures on all toll facilities owned

by the state shall, for accounting purposes, be classified as Category A or Category B expenditures. Notwithstanding any other provision of law, the cost of maintenance of toll facilities in the geographic jurisdiction of the Metropolitan Transportation Commission shall be paid in accordance with the following:

(1) Category A maintenance shall be paid from the State Highway Account and shall include all normal highway maintenance which would be performed by the state according to state procedures as if the facility was a toll-free state facility.

(2) Category B maintenance shall be paid from toll revenues and shall include all maintenance and reconstruction work of those facilities such as toll facility administration buildings and toll booths which are constructed primarily for the purpose of collecting tolls.

(b) In no event shall the Category A maintenance expenditures for the toll bridges in the geographic jurisdiction of the Metropolitan Transportation Commission be funded at a lower percentage than was established in accordance with procedures for funding Category A maintenance of the toll bridges during the 1986-87 fiscal year.

(c) Notwithstanding subdivisions (a) and (b), for each toll bridge specified in Section 30910, maintenance expenditures shall be funded from toll revenues. However, for a toll bridge that is part of the program specified in Section 188.5, maintenance expenditures shall be funded from toll revenues commencing with the completion of the seismic retrofit or replacement work on that bridge as described in Section 188.5. For the purposes of this subdivision, until the obligations of the California Infrastructure and Economic Development Bank secured by the seismic retrofit surcharge imposed pursuant to subdivision (a) of Section 31010 are no longer outstanding, as that term is defined in the constituent instruments defining the rights of the holders of those obligations, the term "toll revenues" shall not include the seismic retrofit surcharge imposed pursuant to subdivision (a) of Section 31010, and the seismic retrofit surcharge imposed pursuant to subdivision (a) of Section 31010 shall remain pledged to the payment of obligations incurred by the California Infrastructure and Economic Development Bank under Chapter 4.6 (commencing with Section 31070). Maintenance expenses that are required to be funded with toll revenues and that would otherwise constitute Category A maintenance expenditures shall be funded from toll revenues remaining after provision is made for payment of all obligations secured by the lien on toll revenues created by subdivision (b) of Section 30960.

SEC. 2. Section 188.5 of the Streets and Highways Code is amended to read:

188.5. (a) The Legislature finds and declares all of the following:

(1) The department has determined that in order to provide maximum safety for the traveling public and to ensure continuous and unimpeded operation of the state's transportation network, six state-owned toll bridges are in need of a seismic safety retrofit, and one state-owned toll bridge is in need of a partial retrofit and a partial replacement.

(2) The bridges identified by the department as needing seismic retrofit are the Benicia-Martinez Bridge, the Carquinez Bridge, the Richmond-San Rafael Bridge, the San Mateo-Hayward Bridge, the San Pedro-Terminal Island Bridge (also known as the Vincent Thomas Bridge), the San Diego-Coronado Bridge, and the west span of the San Francisco-Oakland Bay Bridge. The department has also identified the east span of the San Francisco-Oakland Bay Bridge as needing to be replaced. That replacement span will be safer, stronger, longer lasting, and more cost efficient to maintain than completing a

seismic retrofit for the current east span.

(3) The south span of the Carquinez Bridge is to be replaced pursuant to Regional Measure 1, as described in Section 30917.

(4) The cost estimate to retrofit the state-owned toll bridges and to replace the east span of the San Francisco-Oakland Bay Bridge is four billion six hundred thirty-seven million dollars ($4,637,000,000), as follows:

(A) The Benicia-Martinez Bridge retrofit is one hundred ninety million dollars ($190,000,000).

(B) The north span of the Carquinez Bridge retrofit is one hundred twenty-five million dollars ($125,000,000).

(C) The Richmond-San Rafael Bridge retrofit is six hundred sixty-five million dollars ($665,000,000).

(D) The San Mateo-Hayward Bridge retrofit is one hundred ninety million dollars ($190,000,000).

(E) The San Pedro-Terminal Island Bridge retrofit is sixty-two million dollars ($62,000,000).

(F) The San Diego-Coronado Bridge retrofit is one hundred five million dollars ($105,000,000).

(G) The west span of the San Francisco-Oakland Bay Bridge retrofit, as a lifeline bridge, is seven hundred million dollars ($700,000,000).

(H) Replacement of the east span of the San Francisco-Oakland Bay Bridge is two billion six hundred million dollars ($2,600,000,000).

(b) It is the intent of the Legislature that the following amounts from the following funds shall be allocated until expended, for the seismic retrofit or replacement of state-owned toll bridges:

(1) Six hundred fifty million dollars ($650,000,000) from the 1996 Seismic Retrofit Account in the Seismic Retrofit Bond Fund of 1996 for the seven state-owned toll bridges identified by the department as requiring seismic safety retrofit or replacement.

(2) One hundred forty million dollars ($140,000,000) in surplus revenues generated under the Seismic Retrofit Bond Act of 1996 that are in excess of the amount actually necessary to complete Phase Two of the state's seismic retrofit program. These excess funds shall be reallocated to assist in financing seismic retrofit of the state-owned toll bridges.

(3) Fifteen million dollars ($15,000,000) from the Vincent Thomas Toll Bridge Revenue Account.

(4) The funds necessary to meet both of the following:

(A) A principal obligation of two billion two hundred eighty-two million dollars ($2,282,000,000) from the seismic retrofit surcharge, including any interest therefrom, imposed pursuant to Section 31010, subject to the limitation set forth in subdivision (c) and subdivision (b) of Section 31010.

(B) All costs of financing, including capitalized interest, reserves, costs of issuance, costs of credit enhancements and any other financial products necessary or desirable in connection therewith, and any other costs related to financing.

(5) Thirty-three million dollars ($33,000,000) from the San Diego-Coronado Toll Bridge Revenue Fund.

(6) Not less than seven hundred forty-five million dollars ($745,000,000) from the State Highway Account to be used toward the eight hundred seventy-five million dollars ($875,000,000) state contribution, to be achieved as follows:

(A) (i) Two hundred million dollars ($200,000,000) to be appropriated for the state-local transportation partnership program described in paragraph (7) of subdivision (d) of Section 164, prior to its repeal by Chapter 622 of the Statutes of 1997, for the 1998-99 fiscal year.

(ii) The remaining funds intended for that program and any program

savings to be made available for toll bridge seismic retrofit.

(B) A reduction of not more than seventy-five million dollars ($75,000,000) in the funding level specified in paragraph (4) of subdivision (d) of Section 164, prior to its repeal by Chapter 622 of the Statutes of 1997, for traffic system management.

(C) Three hundred million dollars ($300,000,000) in accumulated savings by the department achieved from better efficiency and lower costs.

(7) Not more than one hundred thirty million dollars ($130,000,000) from the Transit Capital Improvement Program funded by the Public Transportation Account in the State Transportation Fund to be used toward the eight hundred seventy-five million dollars ($875,000,000) state contribution. If the contribution in subparagraph (A) of paragraph (6) exceeds three hundred seventy million dollars ($370,000,000), it is the intent that the amount from the Transit Capital Improvement Program shall be reduced by an amount that is equal to that excess.

(8) (A) The funds necessary to meet principal obligations of not less than six hundred forty-two million dollars ($642,000,000) from the state's share of the federal Highway Bridge Replacement and Rehabilitation (HBRR) Program.

(B) If the project costs exceed four billion six hundred thirty-seven million dollars ($4,637,000,000), the department may program not more than four hundred forty-eight million dollars ($448,000,000) in project savings or other available resources from the Interregional Transportation Improvement Program, the State Highway Operation and Protection Program, or federal bridge funds for that purpose.

(C) None of the funds identified in subparagraph (B) may be expended for any purpose other than the conditions and design features described in paragraph (9).

(9) The estimated cost of replacing the San Francisco-Oakland Bay Bridge listed in subparagraph (H) of paragraph (4) of subdivision (a) is based on the following conditions:

(A) The new bridge shall be located north adjacent to the existing bridge and shall be the Replacement Alternative N-6 (preferred) Suspension Structure Variation, as specified in the Final Environmental Impact Statement, dated May 1, 2001, submitted by the department to the Federal Highway Administration.

(B) The main span of the bridge shall be in the form of a single tower cable suspension design and shall be the Replacement Alternative N-6 (preferred) Suspension Structure Variation, as specified in the Final Environmental Impact Statement, dated May 1, 2001, submitted by the department to the Federal Highway Administration.

(C) The roadway in each direction shall consist of five lanes, each lane will be 12 feet wide, and there shall be 10-foot shoulders as an emergency lane for public safety purposes on each side of the main-traveled way.

(c) If the actual cost of retrofit or replacement, or both retrofit and replacement, of toll bridges is less than the cost estimate of four billion six hundred thirty-seven million dollars ($4,637,000,000), there shall be a reduction in the amount provided in paragraph (4) of subdivision (b) equal to the proportion of total funds committed to complete the projects funded from funds generated from paragraph (4) of subdivision (b) as compared to the total funds from paragraphs (6), (7), and (8) of subdivision (b), and there shall be a proportional reduction in the amount specified in paragraph (8) of subdivision (b).

(d) If the department determines that the actual costs exceed the amounts identified in subparagraph (B) of paragraph (8) of

subdivision (b), the department shall report to the Legislature within 90 days from the date of that determination as to the difference and the reason for the increase in costs.

(e) Notwithstanding any other provision of law, the commission shall adopt fund estimates consistent with subdivision (b) and Section 188.6 and provide flexibility so that state funds can be made available to match federal funds made available to regional transportation planning agencies.

(f) For the purposes of this section, "principal obligations" are the amount of funds generated, either in cash, obligation authority, or the proceeds of a bond or other indebtedness.

(g) (1) Commencing on January 1, 2004, and quarterly thereafter until completion of all applicable projects, the department shall provide quarterly seismic reports to the transportation committees of both houses of the Legislature and to the commission for other seismic retrofit programs.

(2) The reports shall include all of the following:

(A) A progress report for each program.

(B) The program baseline budget for support and capital outlay construction costs.

(C) The current or projected program budget for support and capital outlay construction costs.

(D) Expenditures to date for support and capital outlay construction costs.

(E) A comparison of the current or projected schedule and the baseline schedule.

(F) A summary of milestones achieved during the quarterly period and any issues identified and actions taken to address those issues.

SEC. 3. Section 188.6 is added to the Streets and Highways Code, to read:

188.6. (a) (1) The Legislature finds and declares that on August 16, 2004, the department reported to the Legislature that the funds identified in Section 188.5 are insufficient to complete the state toll bridge seismic retrofit program, including the replacement of the east span of the San Francisco-Oakland Bay Bridge, due to cost overruns for the program now estimated at three billion six hundred million dollars ($3,600,000,000).

(2) By enacting this section, it is the intent of the Legislature to identify additional funds from various sources, as described in subdivision (b), in order to fund this shortfall and so that the toll bridge seismic retrofit and replacement program, as described in Section 188.5, as that section read on January 1, 2005, may proceed to completion without further costly delay.

(b) The following amounts from the following funds shall be allocated until expended in order to eliminate the shortfall identified in subdivision (a) and to complete the seismic retrofit or replacement of state-owned toll bridges as expeditiously as possible:

(1) Not less than two billion one hundred fifty million dollars ($2,150,000,000) from the Bay Area Toll Account, derived from an additional one dollar ($1) surcharge on the state-owned toll bridges within the geographic jurisdiction of the Metropolitan Transportation Commission to be effective no sooner than January 1, 2007.

(2) Not less than eight hundred twenty million dollars ($820,000,000) for the seismic retrofit or replacement of the state-owned toll bridges in the geographic jurisdiction of the Metropolitan Transportation Commission made available through the consolidation of all toll revenues under the management of the Bay Area Toll Authority and from the authorization for the authority to refinance debt secured by toll revenues.

(3) The amount of three hundred million dollars ($300,000,000) to fund the cost of demolition of the existing east span of the San Francisco-Oakland Bay Bridge from funding sources supporting the state highway operations and protection program, from available state resources from project savings, or from the federal Highway Bridge Replacement and Rehabilitation program.

(4) The amount of three hundred thirty million dollars ($330,000,000) from the following accounts:

(A) One hundred thirty million dollars ($130,000,000) from the State Highway Account from accumulated savings by the department achieved from better efficiency, operational savings, and lower costs.

(B) One hundred twenty-five million dollars ($125,000,000) of any excess funds that would otherwise have been transferred in the 2006-07 fiscal year pursuant to subparagraph (F) of paragraph (1) of subdivision (a) of Section 7102 of the Revenue and Taxation Code, as amended by Senate Bill 62 or Assembly Bill 127 of the 2005-06 Regular Session, shall instead be transferred to the Bay Area Toll Account and are hereby appropriated to the department for the purposes of this section. If sufficient funds are not available from this source for this purpose during the 2006 -07 fiscal year, the funding required under this paragraph shall be made available from additional accumulated savings by the department achieved from better efficiency, operational savings, lower costs pursuant to subparagraph (A), or from other state transportation fund accounts as determined by the department in consultation with the California Transportation Commission.

(C) Seventy-five million dollars ($75,000,000) from the fund reserve in the Motor Vehicle Account for the 2005 -06 fiscal year which is hereby appropriated.

(c) If the amount of the overruns estimated by the department, as described in subdivision (a), is less than three billion six hundred million dollars ($3,600,000,000), the savings shall be shared between the state and the authority in the same proportion as their proportional contribution to the estimated cost overruns, as provided in paragraphs (1), (3), and (4) of subdivision (b).

(d) If the actual amount of the overruns exceeds the amount estimated by the department, as described in subdivision (a), the authority shall utilize funds generated under the powers granted to it in Sections 30886, 30950.2, 30954, 30961, and 31011 by the act adding this section in the 2005-06 Regular Session to provide additional financial resources to complete the state toll bridge seismic retrofit program.

(e) Funds made available under this section and Section 188.5 for the replacement of the east span of the San Francisco-Oakland Bay Bridge shall only be expended for the structure described in paragraph (9) of subdivision (b) of Section 188.5 as that section read on January 1, 2005.

SEC. 4. Section 30886 is added to the Streets and Highways Code, to read:

30886. To maximize the availability of funding necessary to complete the state toll bridge seismic retrofit program, to more efficiently manage the toll revenues from the toll bridges located within the region under the jurisdiction of the commission, and to expeditiously complete the seismic retrofit and replacement of the toll bridge facilities identified in paragraph (2) of subdivision (a) of Section 188.5, it is necessary and in the public's interest to consolidate the financial management of all of the toll revenues that are imposed by Sections 30916, 31010, and 31011 and that the Bay Area Toll Authority manage all of those toll revenues.

SEC. 5. Section 30912 of the Streets and Highways Code is amended

to read:

30912. (a) Revenue derived from tolls on all bridges may be expended, subject to the adopted annual budget of the authority, for any of the following purposes:

(1) Safety and operational costs, including toll collection and maintenance costs in accordance with Section 188.4.

(2) Costs of bridge construction and improvement projects, including seismic retrofit and replacement projects, and including debt service and sinking fund payments on bonds issued by the authority for those projects. The repayment of any advances from other state funds may be made from the toll revenue or bond proceeds.

(b) The revenue determined by the authority as derived from the toll increase approved in 1988, and authorized by Section 30917 for class I vehicles on the San Francisco-Oakland Bay Bridge shall be used, to the extent specified in paragraph (4) of subdivision (a) of Section 30914, for the construction of rail extensions specified in Section 30914 or for payment of the principal of, and interest on, bonds issued for those projects, including payments into a sinking fund maintained for that purpose.

SEC. 6. Section 30950.2 of the Streets and Highways Code is amended to read:

30950.2. (a) Except as provided in subdivision (b), the authority is responsible for the administration of all toll revenues from state-owned toll bridges within the geographic jurisdiction of the Metropolitan Transportation Commission.

(b) Notwithstanding any other provision of law, until such time as obligations of the California Infrastructure and Economic Development Bank secured by the seismic retrofit surcharge imposed pursuant to subdivision (a) of Section 31010 are no longer outstanding, as that term is defined in the constituent instruments defining the rights of the holders of those obligations, both of the following apply:

(1) The phrase "toll revenues" as used in Chapter 4 (commencing with Section 30910) and this chapter shall not include the seismic retrofit surcharge imposed pursuant to subdivision (a) of Section 31010.

(2) The seismic retrofit surcharge imposed pursuant to subdivision (a) of Section 31010 shall remain pledged to the payment of obligations incurred by the California Infrastructure and Economic Development Bank under Chapter 4.6 (commencing with Section 31070).

SEC. 7. Section 30952.05 is added to the Streets and Highways Code, to read:

30952.05. (a) The authority and the department shall amend the cooperative agreement required by Section 30952 to incorporate the project oversight and control responsibilities described in this section relative to the construction of the Benicia-Martinez Bridge, as described in Section 30917, and the state toll bridge seismic retrofit program, as described in Section 188.5 as that section read on January 1, 2005.

(b) The department shall develop specifications and bid documents and invite bids and award contracts for the Benicia-Martinez Bridge, as described in Section 30917, and the state toll bridge seismic retrofit program projects. All contract specifications and bid documents shall be reviewed and approved by the authority prior to their release.

(c) The Toll Bridge Program Oversight Committee, created pursuant to Section 30952.1, shall implement a project oversight and project control process for the Benicia-Martinez Bridge project and the state toll bridge seismic retrofit program projects. The committee's

project oversight and control processes shall include, but not be limited to, reviewing bid specifications and documents, providing field staff to review ongoing costs, reviewing and approving significant change orders and claims (as determined by the committee), and preparing project reports.

(d) The authority may contract with, and oversee, one or more consulting firms to provide the services described in subdivision (c) and subdivision (a) of Section 30952.1. All contracts shall be reviewed and approved by the committee prior to their execution. The authority's expenses incurred for project oversight and control services may be reimbursed by toll revenue collected pursuant to Section 30916, 31010, or 31011.

(e) To ensure that the department manages the risks associated with the toll bridge seismic retrofit projects, the department shall, at a minimum, take all of the following actions:

(1) Establish a comprehensive risk management plan that clearly defines roles and responsibilities for risk management and addresses the process by which it will identify and quantify project risks, implement and track risk response activities, and monitor and control risks throughout the duration of the project.

(2) Quantify the effect of identified risks in financial terms.

(3) Develop and maintain documents to track identified risks and related mitigation steps.

(4) Regularly update its estimates of capital and capital outlay support costs.

(5) Regularly reassess its reserves for potential claims and unknown risks, incorporating information related to risks identified and quantified through its risk assessment processes.

(6) Regularly integrate estimates for capital, capital outlay support costs, and contingency reserves into a programwide report.

(7) Ensure that reports to the Federal Highway Administration and others reflect current data and provide an accurate representation of the project's status.

(8) When unexpected events occur, quickly inform the committee created in Section 30952.1 describing the effects of these key events on the project's overall budget and schedule.

SEC. 8. Section 30952.1 is added to the Streets and Highways Code, to read:

30952.1. (a) The authority and the department shall establish a Toll Bridge Program Oversight Committee, which shall consist of the director, the authority's executive director, and the executive director of the California Transportation Commission. The committee may establish a project management team to assist it in performing the duties required of it under this section and Section 30952.05.

(b) The Toll Bridge Program Oversight Committee shall review project status, program costs, and schedules; resolve project issues; evaluate project changes; develop and regularly update cost estimates, risk assessments, and cashflow requirements for all phases of the toll bridge projects; and provide program direction.

(c) In addition to the duties described in subdivision (b), the committee shall review project staffing levels and structures, and consultant and contractor services related to the Benicia-Martinez Bridge construction project, as described in Section 30917, and the state toll bridge seismic retrofit program, as described in Section 188.5.

(d) Expenses incurred by the department, the authority, and the California Transportation Commission for costs directly related to duties required by this section, Section 30952, and Section 30952.05 shall be reimbursed by toll revenue collected pursuant to Section 30916, 31010, or 31011.

(e) The Toll Bridge Program Oversight Committee is not a state

body as that term is defined in Article 9 (commencing with Section 11120) of Chapter 1 of Part 1 of Division 3 of Title 2 of the Government Code.

SEC. 9. Section 30952.2 is added to the Streets and Highways Code, to read:

30952.2. (a) The department shall provide monthly reports to the Toll Bridge Program Oversight Committee, including, but not limited to, the construction status, actual expenditures, and forecasted costs and schedules for the Benicia-Martinez Bridge construction project and the state toll bridge seismic retrofit program projects.

(b) (1) Commencing August 15, 2005, and quarterly thereafter until completion of all applicable projects, the Toll Bridge Program Oversight Committee shall provide quarterly reports within 45 days of the end of each quarter to the transportation and fiscal committees of both houses of the Legislature and the California Transportation Commission for the toll bridge seismic retrofit program in subdivision (a) of Section 188.5.

(2) The report shall include details of each toll bridge seismic retrofit project and all information necessary to clearly describe the status of the project, including, but not limited to, all of the following:

(A) A progress report.

(B) The baseline budget for capital and capital outlay support costs for the revised program cost estimate, as described in Section 188.6.

(C) The current or projected budget for capital and capital outlay support costs.

(D) Expenditures to date for capital and capital outlay support costs.

(E) A comparison of the current or projected schedule and the baseline schedule that was assumed.

(F) A summary of milestones achieved during the quarterly period and any issues identified and actions taken to address those issues.

(G) A summary of the expenses incurred by the Toll Bridge Program Oversight Committee to perform the duties required by Sections 30952.05 and 30952.1.

(H) A summary of the expenses incurred by the department pursuant to Section 30952.3.

(3) The report described in paragraph (1) shall also include a programwide summary of the program's budget status for capital and capital outlay support costs.

SEC. 10. Section 30952.3 is added to the Streets and Highways Code, to read:

30952.3. Notwithstanding any other provision of law, the department may, from the resources provided in Sections 188.5 and 188.6, include incentives and disincentives, or both, to maximize the number of bidders participating in a bid process relative to toll bridge seismic retrofit and replacement projects, and to encourage the timely and thorough completion of contracts awarded for those projects.

SEC. 11. Section 30953 of the Streets and Highways Code is amended to read:

30953. Toll revenues and all other income derived from bridges pursuant to Chapter 4 (commencing with Section 30910) shall be deposited in the Bay Area Toll Account, which is hereby created.

SEC. 12. Section 30954 is added to the Streets and Highways Code, to read:

30954. At such time as obligations of the California Infrastructure and Economic Development Bank secured by the seismic

retrofit surcharge imposed under subdivision (a) of Section 31010 are no longer outstanding, as that term is defined in the constituent instruments defining the rights of the holders of those obligations, all revenues, interest earned, and existing fund balances in the Toll Bridge Seismic Retrofit Account shall be transferred to the authority for deposit in the Bay Area Toll Account.

SEC. 13. Section 30961 of the Streets and Highways Code is amended to read:

30961. Toll bridge revenue bonds shall be issued pursuant to a resolution adopted at any time, and from time to time, by the authority by a majority vote of all members of the authority.

(a) The authority may from time to time issue bonds in accordance with the Revenue Bond Law of 1941 (Chapter 6 (commencing with Section 54300) of Part 1 of Division 2 of Title 5 of the Government Code), for the purpose of constructing, improving, or equipping any of the bridges or for any of the purposes authorized by this chapter, Chapter 4 (commencing with Section 30910), or Chapter 4.5 (commencing with Section 31000). Operation of the bridges or any grouping or units thereof shall constitute an "enterprise" within the meaning of Section 54309 of the Government Code, and the authority shall constitute a "local agency" within the meaning of Section 54307 of the Government Code. Article 3 (commencing with Section 54380) of Chapter 6 of Part 1 of Division 2 of Title 5 of the Government Code shall not apply to the issuance and sale of bonds pursuant to this chapter. Instead, the authority shall authorize the issuance of bonds by resolution, and that resolution shall specify all of the following:

(1) The purposes for which the bonds are to be issued.

(2) The maximum principal amount of the bonds.

(3) The maximum term for the bonds or commercial paper.

(4) The maximum rate of interest to be payable upon the bonds or commercial paper. That interest rate shall not exceed the maximum rate specified in Section 53531 of the Government Code. The rate may be either fixed or variable and shall be payable at the times and in the manner specified in the resolution.

(b) The authority shall keep full and complete accounts for toll revenues and expenses of the toll bridges and shall annually prepare balance sheets showing the financial condition of the entire toll bridge enterprise as well as toll revenues and operating costs for each toll bridge. The accounts and related reports shall be maintained and prepared in accordance with generally accepted accounting practices and shall be subject to an annual audit conducted by an independent certified public accountancy firm licensed to practice in the state.

(c) The authority may issue toll bridge revenue bonds to provide the department with sufficient funds to combine with the unspent proceeds of outstanding obligations of the California Infrastructure and Economic Development Bank under Chapter 4.6 (commencing with Section 31070) to establish that those obligations are no longer outstanding, as that term is defined in the constituent instruments defining the rights of the holders of those obligations.

(d) As and when requested by the authority, the department and the California Infrastructure and Economic Development Bank shall take all actions necessary or appropriate to promptly establish that obligations of the bank under Chapter 4.6 (commencing with Section 31070) are no longer outstanding and to effect the consolidation of toll revenues in accordance with Section 188.6.

SEC. 14. Section 30961.1 is added to the Streets and Highways Code, to read:

30961.1. Not later than December 31, 2005, the California Transportation Commission, in consultation with the department and

the authority, shall adopt a schedule for the payment of the remaining state contributions identified in Sections 188.5 and 188.6 for the toll bridge seismic retrofit and replacement projects identified in Section 188.5. The schedule shall include the timing and sources of the state contributions to the state toll bridge seismic retrofit and replacement program. The schedule shall provide for the state contributions to be made available for expenditure commencing in the fiscal year 2005-06, and in a manner that distributes the state contributions over the years during which construction of the toll bridge seismic retrofit and replacement program occurs and ensures that the state contributions are made in a manner that provides a timely balance between those sources and the contribution from toll revenues. The schedule shall include and make available for expenditure, the state contribution identified in subparagraph (B) of paragraph (8) of subdivision (b) of Section 188.5 commencing in fiscal year 2008-09, and shall distribute it over that fiscal year and each of the fiscal years during which construction of the state toll bridge seismic retrofit and replacement program occurs. The California Transportation Commission, in consultation with the department and the authority, may update and revise the schedule as it determines is necessary.

SEC. 15. Section 31010 of the Streets and Highways Code is amended to read:

31010. (a) There is hereby imposed a seismic retrofit surcharge equal to one dollar ($1) per vehicle for passage on the Bay Area state-owned toll bridges, except for vehicles that are authorized toll-free passage on these bridges.

(b) Funds generated pursuant to subdivision (a) that are in excess of those needed to meet the toll commitment as specified by paragraph (4) of subdivision (b) of Section 188.5 shall be available to the authority for funding, consistent with Sections 30913 and 30914, the purposes and projects described in those sections.

(c) Except as provided in subdivision (d), funds generated pursuant to subdivision (a) shall be paid to the authority directly and deposited in the Bay Area Toll Account pursuant to Section 30950.2 and shall constitute revenues of the tolls imposed on the bridges described in Section 30910 for all purposes of Chapter 4.3 (commencing with Section 30950).

(d) Funds generated pursuant to subdivision (a) shall be used exclusively to repay obligations issued by the California Infrastructure and Economic Development Bank and secured by the surcharge imposed by subdivision (a) until they are no longer outstanding, as that term is defined in the constituent instruments defining the rights of the holders of those obligations. This subdivision shall become inoperative when the obligations are no longer outstanding, as that term is defined in the constituent instruments defining the rights of the holders of those obligations.

(e) The department may increase the amount of the seismic retrofit surcharge identified in subdivision (a) for debt service purposes only on the obligations issued by the California Infrastructure and Economic Development Bank under Chapter 4.6 (commencing with Section 31070) and only for as long as those obligations are outstanding, as that term is defined in the constituent instruments defining the rights of the holders of those obligations, if circumstances exist that have resulted in a reduction in the funds generated by subdivision (a) so as to jeopardize the payment of debt service on those obligations. This subdivision shall become inoperative when those obligations are no longer outstanding due to their retirement or defeasance.

SEC. 16. Section 31011 is added to the Streets and Highways Code,

to read:

31011. (a) The authority may increase the amount of the surcharge described in Section 31010 for the purpose of completing the state toll bridge seismic program described in Section 188.5 and to meet its obligations under the act adding this section in the 2005-06 Regular Session. No increase shall be made effective prior to January 1, 2007.

(b) Notwithstanding any other provision of law, revenues generated by an increase imposed pursuant to this section shall be deposited in the Bay Area Toll Account.

(c) The authority shall hold at least two public meetings at least 45 days before taking any action pursuant to subdivision (a) to increase the amount of the surcharge.

(d) The authority may reduce the amount of the surcharge described in subdivision (a) to encourage electronic toll payment.

SEC. 17. Section 31020 of the Streets and Highways Code is repealed.

SEC. 18. Section 31020 is added to the Streets and Highways Code, to read:

31020. Notwithstanding Section 30953, as amended by the act adding this section in the 2005-06 Regular Session, revenue generated from the seismic retrofit surcharge imposed pursuant to subdivision (a) of Section 31010 shall be deposited in the account until obligations secured by that seismic retrofit surcharge and issued by the California Infrastructure and Economic Development Bank under Chapter 4.6 (commencing with Section 31070) are no longer outstanding as that term is defined in the constituent instruments defining the rights of the holders of those obligations. After obligations of the bank secured by toll funds are no longer outstanding, all toll revenues generated from bridges in the geographic jurisdiction of the Metropolitan Transportation Commission shall be deposited in the Bay Area Toll Account.

SEC. 19. Section 31021 is added to the Streets and Highways Code, to read:

31021. Projects in the state toll bridge seismic retrofit and replacement program described in Section 188.5 are not subject to administrative overhead cost assessments by the department because they are within the duties described in Section 30952.

SEC. 20. Section 182.2 is added to the Streets and Highways Code, to read:

182.2. Notwithstanding any other provision of law, toll bridge seismic retrofit and replacement projects described in Section 188.5 shall continue to be governed by the provisions of former Article 4.9 (commending with Section 180), as added by Chapter 15 of the Statutes of 1994 and subsequently amended, as that article read on January 1, 2005, other than former Section 180.7 relative to repeal. This section shall become inoperative when all toll bridge seismic retrofit and replacement projects described in Section 188.5 are complete.

SEC. 21. The provisions of this act are severable. If any provision of this act or its application is held invalid, that invalidity shall not affect other provisions or applications that can be given effect without the invalid provision or application.

SEC. 22. No reimbursement is required by this act pursuant to Section 6 of Article XIII B of the California Constitution because a local agency or school district has the authority to levy service charges, fees, or assessments sufficient to pay for the program or level of service mandated by this act, within the meaning of Section 17556 of the Government Code.

SEC. 23. This act is an urgency statute necessary for the immediate preservation of the public peace, health, or safety within

the meaning of Article IV of the Constitution and shall go into immediate effect. The facts constituting the necessity are:

In order to provide financing necessary to complete the state-owned toll bridge seismic retrofit and replacement program as quickly as possible, it is necessary that this act take effect immediately.

Appendix B

AGREEMENT ON COMMITTEE PROCEDURES
FOR THE TOLL BRIDGE PROGRAM OVERSIGHT COMMITTEE

This Agreement is entered into and effective this 9th day of November, 2005, by and among the Director of the California Department of Transportation, (the "Department"), the Executive Director of the Bay Area Toll Authority (the "Authority") and the Executive Director of the California Transportation Commission (the "Commission"), for the purpose of outlining the roles and areas of responsibility set out in Chapter 71, Statutes of 2005, related to the duties and responsibilities of the Toll Bridge Program Oversight Committee. The Department, Authority and Commission are collectively referred to as the " Agencies."

RECITALS

WHEREAS, the California Streets and Highways Code (SHC) Section 330952.1 requires the Department and Authority hereinafter referred to collectively as the "Establishing Agencies," to establish a Toll Bridge Program Oversight Committee, hereinafter referred to as the "Committee," consisting of the Director of the Department, the Executive Director of the Authority and the Executive Director of the Commission, hereinafter collectively referred to as the "Committee Members;" and

WHEREAS, the Committee Members desire to establish an agreement outlining their roles and responsibilities in carrying out the work of the Committee;

NOW, THEREFORE, the Committee Members hereto agree as follows:

I. TERM.

The term of this Agreement shall commence when fully executed, and unless amended earlier, shall terminate when the Bridge Projects have been accepted by the Department, the Bridge Projects contractor claims have been resolved through settlement or public works arbitration and environmental mitigation has been concluded.

II. TOLL BRIDGE PROGRAM OVERSIGHT COMMITTEE MANAGEMENT AND ORGANIZATION

A. Committee Members Qualifications

In the event a Committee Member, for whatever reason, no longer serves in his or her Director's position with his or her respective Agency, the Committee

Member shall be replaced by his or her successor or acting successor, as determined by that Committee Member's Agency.

B. Chairperson

The Committee will select a Chairperson. The Chairperson position will rotate between the members affiliated with the Establishing Agencies every two years. The Chairperson shall preside over the meetings of the Committee and shall perform all other duties incident to the position or as assigned to him or her by the Committee.

C. Decision-making

The Committee will endeavor to make decisions on a consensus basis. When a vote by the Committee is necessary, a majority vote of Committee Members is required to approve an item. Every act or decision made by the majority vote of the Committee Members is an act of the Committee. A quorum of the Committee is two. A meeting at which all the Committee Members are initially present may continue to make decisions and transact business not withstanding the withdrawal of one of its members.

D. Responsibilities

The Committee will:

1. Provide oversight and financial direction for the Bridge Projects.
2. Review and approve project reporting of the Bridge Projects status, program costs and schedules and provide reports to the Authority on a monthly basis.
3. Approve all contracts for project oversight and control for the Bridge Projects.
4. Review and recommend for approval contract specifications and bid documents for the Bridge Projects.
5. Resolve project budget issues and review and recommend budget and fund allocation adjustments.
6. Evaluate Bridge Project changes and review and approve significant change orders and claims over one million dollars ($1,000,000).
7. Develop and regularly update cost estimates, risk assessment, and cash flow requirements for all phases of the Bridge Projects.
8. Review staffing structures and levels for the Bridge Projects.
9. Review and approve consultant and contractor services related to the oversight duties of the Committee for the Bridge Projects.

10. Report to the Transportation and Fiscal committees of both houses of the Legislature and the Commission on a quarterly basis, as specified in SHC Section 30952.2(b).

11. Assume such other responsibilities as may be assigned to it by the Agencies or as a result of subsequent legislative amendments.

E. Meetings

Regular meetings of the Committee shall be held monthly or as otherwise determined by the Committee. Special meetings of the Committee can be held for any purpose, by any method, including the use of conference telephone, electronic video screen communication or other electronic communications equipment, so long as all members participating in such meeting can concurrently communicate with the other members. Meetings may be called at any time by the Chairperson or any other of the Committee Members. Notice of all meetings shall be given at least two business days prior to the meeting. Notice shall include an agenda of items on which the Committee will take action. Any member of the Committee has the right to request that action on a particular item be deferred to allow for further review of the proposed item. Upon such a request, action on that item will be deferred for the time period requested by that member, up to a maximum of seven days. Each member of the Committee has the right to place a matter on the Committee's agenda for consideration.

F. Actions Without a Meeting

Any action required or permitted to be taken by the Committee may be taken without a meeting by way of written memorandum if all members of the Committee, individually or collectively, consent in writing to that action. The written consent or consents shall be filed with the minutes of the Committee. Action by written consent shall have the same force and effect as a vote of the Committee Members taken during a meeting.

G. Records, Minutes of Meetings, and Inspection Rights

The Committee shall keep all records, documents and minutes of meetings at the principal executive offices of the Department. In the event a request for records or documents generated for or by the Committee is received by a member of the Committee, the member shall, within 24 hours, notify all other Committee members of the request.

H. Project Management Team

The Committee hereby establishes a Project Management Team (PMT) that shall assist the Committee in the performance of its duties. The PMT shall consist of one staff member selected by each member of the Committee. The members of the PMT shall review matters that are to be brought before the Committee.

At the request of the Committee, the PMT may perform the following:

- Prepare agendas for the Committee's meetings.
- Assist the Committee in the performance of its duties by providing regular reports to the Committee on Bridge Project status, scope and issues involving budgeting, expenditures, staffing and contractor services.
- Assist the Committee in the review of contract specifications and bid documents, and other documents.
- Assist the Committee in the review of project status and schedules and to anticipate, identify, evaluate, and report to the Committee concerning any project issues as they arise.
- Assist the Committee in the development of cost estimates, risk assessments, and cash flow requirements.
- Review proposed contract change orders for Committee consideration and approval.
- Review claims for Committee consideration and approval.
- Assist the Committee in reviewing staffing levels and structures.
- Prepare other project related reports for Committee review.
- Perform such other assignments as appropriate.
- In carrying out the above tasks, seek assistance whenever appropriate from consultants retained by any of the Agencies doing work related to the Bridge Projects.

The PMT shall keep Committee Members informed as to its work, and will promptly provide any information in its possession which may be requested by a Committee Member.

I. Advance Notice of Significant Issues

Each Committee Member will provide to the other Committee Members and to the PMT advance notice of significant change orders and claims and other potential action items which are likely to be brought before the Committee by the Agency with whom that Member is associated in order to provide the Committee Members an adequate opportunity for review and preparation.

III. GENERAL

A. Integration Clause

This Agreement constitutes the complete and entire understanding among the Committee Members.

B. Amendments

This Agreement may be amended in writing from time to time upon agreement of the Committee Members.

C. Counter Parts

This Agreement may be executed in counterparts, each one of which will be an original or the equivalent thereof.

D. Miscellaneous

This Agreement is intended solely as a guide to the obligations, intentions and policies of the Committee Members. It does not constitute an authorization for funding a project nor does it constitute a legally binding agreement amongst the Agencies.

IN WITNESS WHEREOF, the Committee Members hereto have agreed to this Agreement on the date opposite their respective names.

Will Kempton
Director, California Department of Transportation

Date: 11/21/05

Steve Heminger
Executive Director, Bay Area Toll Authority

Date: 11/21/05

Diane C. Eidam
Executive Director, California Transportation Commission

Date: 11/21/05

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Appendix C

TOLL BRIDGE PROGRAM
OVERSIGHT COMMITTEE

CALTRANS BAY AREA TOLL AUTHORITY CALIFORNIA TRANSPORTATION COMMISSION

2007 East Span Strategic Plan
Briefing Document

April 2007

TABLE OF CONTENTS

EXECUTIVE SUMMARY

To Members of the Toll Bridge Oversight Committee,

The San Francisco-Oakland Bay Bridge (SFOBB), one of the three busiest bridges in the nation, serves as the most significant regional connection in the Bay Area, carrying an average of 280,000 vehicles a day. Noted as the most ambitious public works effort in California's history, the seismic retrofitting of the SFOBB, specifically the replacement of the East Span, poses significant challenges to those that are responsible for completing the bridge. The State of California Department of Transportation (Department), the Bay Area Toll Authority (BATA), and the California Transportation Commission (CTC), under the direction of the interagency Toll Bridge Program Oversight Committee (TBPOC), are charged with the challenge of delivering to the public a seismically safe bridge as expeditiously as possible, in a cost effective manner, with minimal disruption to the traveling public. The East Span Strategic Plan is intended to serve as a 'road-map' for activities in 2007 and the near future.

In short, we need to provide a seismically safe bridge as soon as possible, keep traffic flowing as major construction work progresses, while maintaining positive relationships and delivering the program within the current budget.

Without proactive planning, implementation, and evaluation, the East Span replacement of the SFOBB will not be completed in an earlier time frame than currently scheduled, within budget or with minimal disruptions to the public. We can expect media outcry on cost-overruns, schedule delays, and complaints from the public and legislators.

Our mission: Enhance the regional seismic safety and mobility of the traveling public through the accomplishment of the goals and objectives by expediting project/program delivery and ensuring efficient and effective use of public funds.

First, we plan to reach seismic safety as soon as technically possible through continuously identifying opportunities to compress the timeline and accelerate the schedule to seismic safety. The key to fulfilling this goal is to align the three project elements, Yerba Buena Island (YBI), the Self-Anchored Suspension (SAS), and the Oakland Touchdown. At the heart of 'leaving no stone unturned' in finding schedule compression opportunities is the development, planning, and implementation of the East Span Opportunity Schedule. The strategy we propose in opening the East Span in both directions earlier than the current schedule of September 2013 draws on diverse areas of the program--Construction, Design, Risk Management, and Corridor Scheduling. First, we are identifying, planning, and implementing opportunities to shorten the schedule that will allow us to deliver the East Span earlier than the currently approved schedule of September 2013. Rather than focus on reducing the schedule through incremental schedule changes, we are continuously identifying ways to compress the schedule and advance work forward, while reducing potential risks. We have identified items such as advancing of the foundation work for the Yerba Buena Island Transition Structure (YBITS) by adding the work to the detour contract. Early construction of this work significantly reduces risk both in terms of cost and potential delay to the East Span corridor schedule. In addition, we have identified as part of the West Tie-In design, the replacement of the YBI viaduct that will advance seismic safety for this portion of the East Span. Work on the YBI viaduct was originally scheduled for completion as part of YBITS in 2013 but now seismic safety on this portion of the bridge will be achieved as early as 2007.

We plan to engage and work with the contractors to identify additional opportunities to accelerate schedule for Yerba Buena Island, Self-Anchored Suspension (SAS), and Oakland Touchdown (OTD). For the SAS, we will discuss opportunities with the contractor to accelerate fabrication, temporary tower and cable system erection and load transfer. We will discuss opportunities for eastbound SAS to be ready to open to traffic earlier and eastbound YBI and OTD ready to open to traffic earlier.

In addition to identifying opportunities to accelerate and compress the schedule, we plan to simultaneously identify activities with higher potential to delay, thereby working against acceleration, and act to avoid delay. We will focus on critical elements of the SAS and YBI such as W2, work being done to prepare for fabrication (RFIs, RFCs, submittals, CCOs), YBI detour traffic switches, temporary towers, crane fabrication, and utilities coordination. We will continue development of specialized teams to work with the contractors to identify and solve potential conflicts.

Second, we propose to maintain positive relationships, communications and outreach with the public and stakeholders to ensure smooth project implementation. The tools and organization to realize this goal are already in place--The Communications Plan approved in 2005 by TBPOC and the inter-agency Communications Partnership Team (CPT) comprised of the Department, BATA, and CTC staff. We have demonstrated success in maintaining positive relationships, communications, and outreach through multiple and highly complex outreach efforts such as the West Approach staged demolition and construction work over the 2006 Labor Day weekend. We continue to identify tools and innovate solutions to better communicate with the public. We launched a new definitive website providing up-to-date information for all Bay Bridge projects; a new newsletter, Bay Bridge News, distributed to over 5,000 subscribers in print and electronically, and E-Alerts providing timely information regarding upcoming major construction activities.

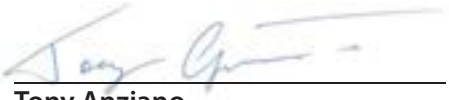
We will continue, maintain and develop positive relationships, communications, and outreach by proactively planning for major construction and outreach milestones, managing legislative issues as they arise, improving agency cooperation through the CPT and addressing project history and legacy of schedule and cost by being transparent and focusing on the future. We will place substantial effort around time management and agency cooperation/coordination critical to the success of conveying a consistent message to the public communicated by three agencies.

Third, we propose maintaining fiscal responsibility while supporting schedule acceleration and delivery of the program. We will focus on providing the resources needed to compress the schedule and accelerate time to seismic safety. This will be done by first managing the program contingency, the AB144 $900 million amount of funds in reserve at the program level, through trend projection of contingency use. Cost of acceleration and other costs will be identified, projected, and monitored to ensure the project stays within the approved budget. Recognizing that accelerating the schedule may require additional resources, we will place substantial effort on identifying opportunities for cost savings in capital outlay support assuming earlier time to seismic safety and completion date.

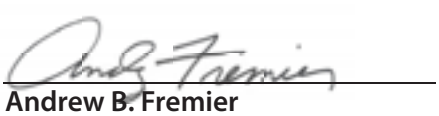
To summarize, the Program Management Team has drawn on diverse technical, non-technical, and management skills within the Department, BATA, and CTC to create a strategic plan for completing the East Span of the SFOBB. What has been a project delivering on its current milestones, on its current approved schedule is evolving into a project that 'pushes the envelope' to deliver and achieve seismic safety of the SFOBB earlier than the current schedule by continuously improving and challenging standard practices. We believe by achieving the three goals of *accelerating the schedule to seismic safety, maintaining positive relationships, communications, and outreach, and maintaining fiscal responsibility to deliver the program*, through these means, we will ultimately enhance regional seismic safety and mobility of the traveling public through the completion of the SFOBB.

As we progress, we will continue to keep you informed on a monthly basis on how we are performing against the opportunity schedule, maintaining positive relationships, and maintaining fiscal responsibility. Your continued support and direction of the SFOBB is critical to the success of the program.

Toll Bridge Program Management Team



Tony Anziano
Toll Bridge Program Manager
Department of Transportation



Andrew B. Fremier
Deputy Executive Director
Bay Area Toll Authority

Stephen V. Maller
Deputy Director
California Transportation Commission

INTRODUCTION

The East Span Strategic Plan will be used to guide decision-making, development activities, and program delivery. This strategic planning process began in response to a request from the TBPOC and was guided by the PMT. On February 15, 2007, the PMT presented the Draft East Span Strategic Plan that outlined the goals and objectives to completing the San Francisco-Oakland Bay Bridge earlier than the current schedule of September 2013. In response to comments from the TBPOC, the Plan was revised to focus on three key goals:

- Accelerate schedule to seismic safety earlier than current schedule of September 2013;
- Maintain positive relationships, communications, and outreach with the public and stakeholders to ensure smooth implementation;
- Maintain fiscal responsibility while supporting schedule acceleration and deliver the program.

The East Span Strategic Plan includes a mission statement, goals, objectives, and action plans for achieving these goals and objectives. A key component of this strategic plan is performance measures/indicators, which will enable the TBPOC to monitor program status.

Developing the Plan

To drive effective implementation, the PMT collected information and perspectives from senior managers, middle managers, and staff from Caltrans, BATA, and CTC, and obtained consensus through a planning workshop and meetings. Caltrans , BATA, and CTC intend to inform the TBPOC on performance through actions plans and performance measures; refining plans periodically to meet internal and external factors.

Action Plans: The Roadmap

Caltrans, BATA, and CTC used a multi-step approach for developing actions plans for the strategic plan which involved identifying critical success factors for each objective; mapping current or planned initiatives against the critical success factors, and identifying additional actions required to achieve the objectives. The action plans include a range of strategic activities for technical, management, and program support functions. Action plans will be used as a roadmap for identifying priority initiatives, planning and managing projects, and tracking progress toward goals and objectives. Plans will be used in formulating and rationalizing budget requests, identifying dependencies among related projects, and managing staffing and other resource requirements.

Progress Reporting

The PMT plans to use the East Span Strategic Plan to guide internal planning and management practices and enhance support to the TBPOC. The PMT plans to review implementation of the strategic plan by tracking progress against action plans and update and modify as necessary. We plan to link the budget to the goals, objectives, and action plans identified in the Plan. The supporting strategic performance measures will enable the TBPOC to track performance in key areas related to time/seismic safety, public relations, and financial management. We plan to proactively communicate performance levels to the TBPOC and staff on a monthly/quarterly basis.

MISSION, GOALS AND OBJECTIVES

Our Mission is to enhance the regional seismic safety and mobility of the traveling public through the accomplishment of the goals and objectives by expediting project/program delivery and ensuring efficient and effective use of public funds.

SFOBB Goal

Open East Span to traffic in both directions earlier than the current schedule of September 2013.

GOAL 1 Accelerate schedule to seismic safety earlier than current schedule of September 2013	**O1.1 PLAN** O1.1.1 - Continuously identify activities with higher potential to accelerate O1.1.2 - Continuously identify activities with higher potential to delay, thereby working against acceleration, and act to avoid delay
	O1.2 IMPLEMENT Act to engage acceleration activities and identify who is responsible for individual activity
	O1.3 EVALUATE Monitor current approved schedule status against the opportunity schedule
GOAL 2 Maintain positive relationships, communications and outreach with the public and stakeholders to ensure smooth implementation	O2.1 – Improve time management (planning time, defining priorities, organizing/coordinating resources)
	O2.2 – Proactively manage legislative issues (access/timing)
	O2.3 – Improve agency cooperation
	O2.4 – Address history, legacy of schedule and cost by being transparent and focusing on the future
	O2.5 – Develop a strategy on how to break a story
GOAL 3 Maintain fiscal responsibility while supporting schedule acceleration and delivery of the program	O3.1 – Manage program contingency through trend projection of contingency use
	O3.2 – Stay within approved budget; Improve communication tools to track, monitor, and report budget status
	O3.3 – Identify opportunities for Capital Outlay Support (COS) cost savings

ACTION PLAN

GOAL 1: Time/Seismic Safety

Accelerate schedule to seismic safety earlier than current schedule of September 2013

OBJECTIVES	ACTIONS	MEASURE/ INDICATOR	TEAM
O1.1 PLAN **O1.1.1 Continuously identify activities with higher potential to accelerate**			
O1.1.1.1 Identify items that can be taken off critical path .1 OTD – Move large amounts of OTD work forward	O1.1.1.1 .1 Redefine an early OTD contract, place as much OTD work as possible on it, and complete early	O1.1.1.1 .1 Acceptance of idea Progress of PS&E Dates for advertisement, award Construction Progress	CT, BATA, CTC, Design, Construction
O1.1.1.2 Engage and work with contractor to identify opportunities to accelerate schedule (SAS, YBI, OTD)	O1.1.1.2 Meet with contractor to discuss opportunities to: .1 Accelerate to fabrication .2 Accelerate fabrication .3 Accelerate cable system erection and load transfer .4 E/B SAS ready to open to traffic earlier .5 E/B YBI and OTD ready to open to traffic earlier	O1.1.1.2 Acceptance of ideas; Changes to opportunity schedule to reflect ideas .1 to .5 – Work plans to implement ideas	CT, BATA, CTC, Design, Construction
O1.1.2 Continuously identify activities with higher potential to delay and act to avoid delay			
O1.1.2.1 (SAS & YBI) Do not let W2 delay project	O1.1.2.1 .1 Develop specialized team; .2 Optimize work across multiple contracts by proactively engaging ABF and other YBI contractors to fully communicate means and methods plans .3 Identify and solve potential conflicts	O1.1.2.1 .1 Team in place; Occurrence of meetings/ minutes; .2 Progress of meetings, review of means and methods (including schedule), identification of potential conflicts, development of acceptable solution plan; .3 Acceptance of plan; CCOs if necessary; Construction progress	CT, BATA, CTC, Construction, ABF, YBI contractors, likely Design, YBI stakeholders

OBJECTIVES	ACTIONS	MEASURE/ INDICATOR	TEAM
O1.1.2 Continuously identify activities with higher potential to delay and act to avoid delay *(continued)*			
O1.1.2.2 (SAS) Do not let RFIs, RFCs, submittals , CCOs delay project	O1.1.2.2 See O1.2.1 under IMPLEMENT "Accelerate TO fabrication"	O1.1.2.2 See O1.2.1 under IMPLEMENT "Accelerate TO fabrication"	CT, BATA, CTC, Design, Const., METS, ABF/Subs (e.g. shop drawers, QC sub) ZPMC, TYLin, PB/ HNTB/Subs
O1.1.2.3 (YBI/South-South Detour) Do not let YBI Detour switches delay project (fall 2007, spring 2009)	O1.1.2.3 .1 Further develop specialized teams .2 Move work forward when possible .3 Work proactively with contractor and subs .4 Develop highly planned switching scenario(s).	O1.1.2.3 .1 Fully mobilized team; Progress of design to satisfy CCO requirements; Progress and completion of CCOs; Completion of design; Progress of shop drawings, weld trials, fabrication and other related items .2 Construction progress .3 Communicate routinely with contractor and subs/ Feedback from contractor; Terms of agreement with contractor	CT, BATA, CTC, Design, construction, METS, CCM and other subs, ZPMC, TYLin, PB
O1.1.2.4 (SAS) Do not let temporary towers (technical issues) delay project	O1.1.2.4 .1 Work with ABF and subs to continue to proactively draw issues forward and solve quickly	O1.1.2.4 .1 Feedback from contractor; fully mobilized team; complete design; CCOs; shop drawings; weld trials fabrication; construction progress	CT, BATA, CTC, Design, Const., METS, ABF/SubsTYLin, SSPRP
O1.1.2.5 (SAS) Do not let crane delay project	O1.1.2.5 .1 Check schedule with contractor .2 Consider terms of acceleration	O1.1.2.5 .1 Contractor's feedback .2 Terms of pullback; potential CCO	CT, BATA, CTC, Construction, ABF and subs
O1.1.2.6 (all contracts) Do not let utilities coordination delay project	O1.1.2.6 .1 Create specialized team .2 Develop optimized plan, finalize plan, and implement ASAP	O1.1.2.6 .1 Team in place .2 Progress of plan, CCOs, PS&E changes, construction progress	CT, BATA, CTC, Construction, Design, TYLin-MN, PB, contractors, multiple outside stakeholders

OBJECTIVES	ACTIONS	MEASURE/ INDICATOR	TEAM
O1.2 IMPLEMENT **Act to engage acceleration activities and identify who is responsible for individual activity**			
O1.2.1 Accelerate TO fabrication	O1.2.1 Expedite and monitor: .1 RFIs .2 RFCs .3 Submittals .4 CCOs .5 Prefabrication trials.	O1.2.1 .1, .2, .3, .4 Turnaround times .3 Approval/rejection rates .5 Weld trial teams full staffed and mobilized	CT, BATA, CTC, Design, Const., METS, ABF/Subs (e.g. shop drawers, QC sub) ZPMC, TYLin, PB,HNTB,Subs
O1.2.2 Accelerate fabrication	O1.2.2 Expedite fabrication production on large number of production pieces	O1.2.2 Decision from contractor if willing to take opportunity/risk. If yes, agree on terms and conditions Complete CCOs, production rates	CT, BATA, CTC, ABF, ZPMC, Construction, METS
O1.2.3 Accelerate cable system erection and load transfer	O1.2.3. Expedite and monitor: .1 Cable erection .2 Load transfer	O1.2.3 Decision from ABF and subs, completed CCOs	CT, BATA, CTC, ABF and subs, Construction
O1.2.4 Make E/B SAS ready to open to traffic earlier than current contract schedule	O1.2.4 Complete selected work planned prior to E/B open following E/B open behind designed lane closures	O1.2.4 Decision from contractor on idea, changes to YBI and OTD to acceleration to match, then CCOs. Complete CCOs, production rates	CT, BATA, CTC, Design, Const, METS, ABF/subs, ZPMC
O1.2.5 Make E/B YBI & OTD ready to open to traffic earlier than current corridor schedule	O1.2.5 Develop and implement combination of moving forward, simplifying or completing after opening work on YBI and OTD	O1.2.5 Consensus on feasibility, changes to PS&E, Award or CCO (progress), construction progress	CT, BATA, CTC, Design, Const, YBI stakeholders,, YBI and OTD contractors

OBJECTIVES	ACTIONS	MEASURE/ INDICATOR	TEAM
O1.3 EVALUATE **Monitor current schedule status against the opportunity schedule**			
O1.3.1 SAS	O1.3.1 Develop 'dashboard' to monitor and report on progress against the opportunity schedule	O1.3.1 Monthly or quarterly report to TBPOC	CT, BATA, CTC (PMT)
O1.3.2 YBI	O1.3.2 Develop 'dashboard' to monitor and report on progress against the opportunity schedule	O1.3.2 Monthly or quarterly report to TBPOC	CT, BATA, CTC (PMT)
O1.3.3 OTD	O1.3.3 Develop 'dashboard' to monitor and report on progress against the opportunity schedule	O1.3.3 Monthly or quarterly report to TBPOC	CT, BATA, CTC (PMT)

GOAL 2: Relationships, Communications, and Outreach

Maintain positive relationships, communications, and outreach with the public and stakeholders to ensure smooth implementation

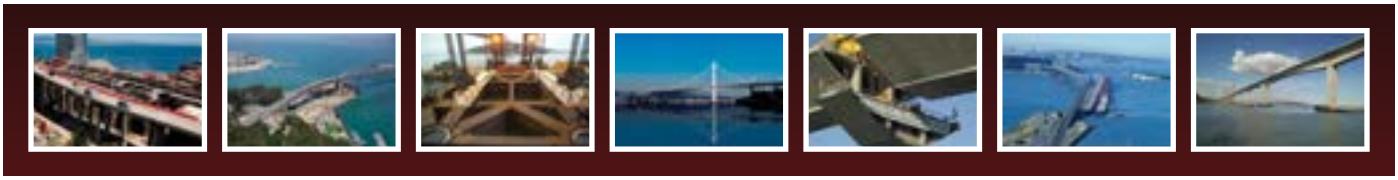
OBJECTIVES	ACTIONS	MEASURE/ INDICATOR	TEAM
O2.1 Time management Planning time, defining priorities, organizing resources	O2.1 Identify milestones, prioritize tasks according to importance and urgency, identify/coordinate resources to implement	O2.1 Synchronized work effort	Communications Partnership Team (CPT)
O2.2 Proactively manage legislative issues by making the Governor our "pal." (access/timing)	O2.2 Develop tour/press invitation	O2.2 Completed Tour	Communications Partnership Team (CPT)
O2.3 Improve agency cooperation	O2.3 Increase communications between individuals on the CPT; identify ways to streamline communication	O2.3 Increased productivity for CPT	Communications Partnership Team (CPT)
O2.4 Address history, legacy of schedule and cost by being transparent and focusing on the future	O2.3 Develop internal fact sheet (*BSA web) Develop talking points (external)	O2.3 Internal Fact Sheet Talking points	Communications Partnership Team (CPT)
O2.5 Develop a strategy on how to break a story	O2.5 Coordinate agencies to plan for and identify milestones, manage time, and promote External coordination	O2.5 Action Plan	Communications Partnership Team (CPT)

GOAL 3: Finance

Maintain fiscal responsibility while supporting schedule acceleration and delivery of the program

OBJECTIVES	ACTIONS	MEASURE/ INDICATOR	TEAM
O3.1 Manage program contingency through trend projection of contingency use	O3.1 Identify trend, costs of acceleration and other costs Formalize finance group	O3.1 Cost Benefit Analysis Roles and Responsibilities of Finance Group	Finance Team
O3.2 Stay within approved budget; Improve communication tools to track, monitor, and report budget status	O3.2 Develop internal communications protocol between agencies related to finances Develop internal trend report	O3.2 Communications Protocol for Finance Internal Trend Report	Finance Team
O3.3 Identify opportunities for Capital Outlay Support (COS) cost savings	O3.3 Develop COS/forecast updates Identify COS trend, costs of acceleration and other costs Communicate to PMT at quarterly RMT meetings	O3.3 Capital Outlay Support trend Quarterly RMT briefing to PMT identified on agenda/ calendar	Finance Team RMT/ Finance Team

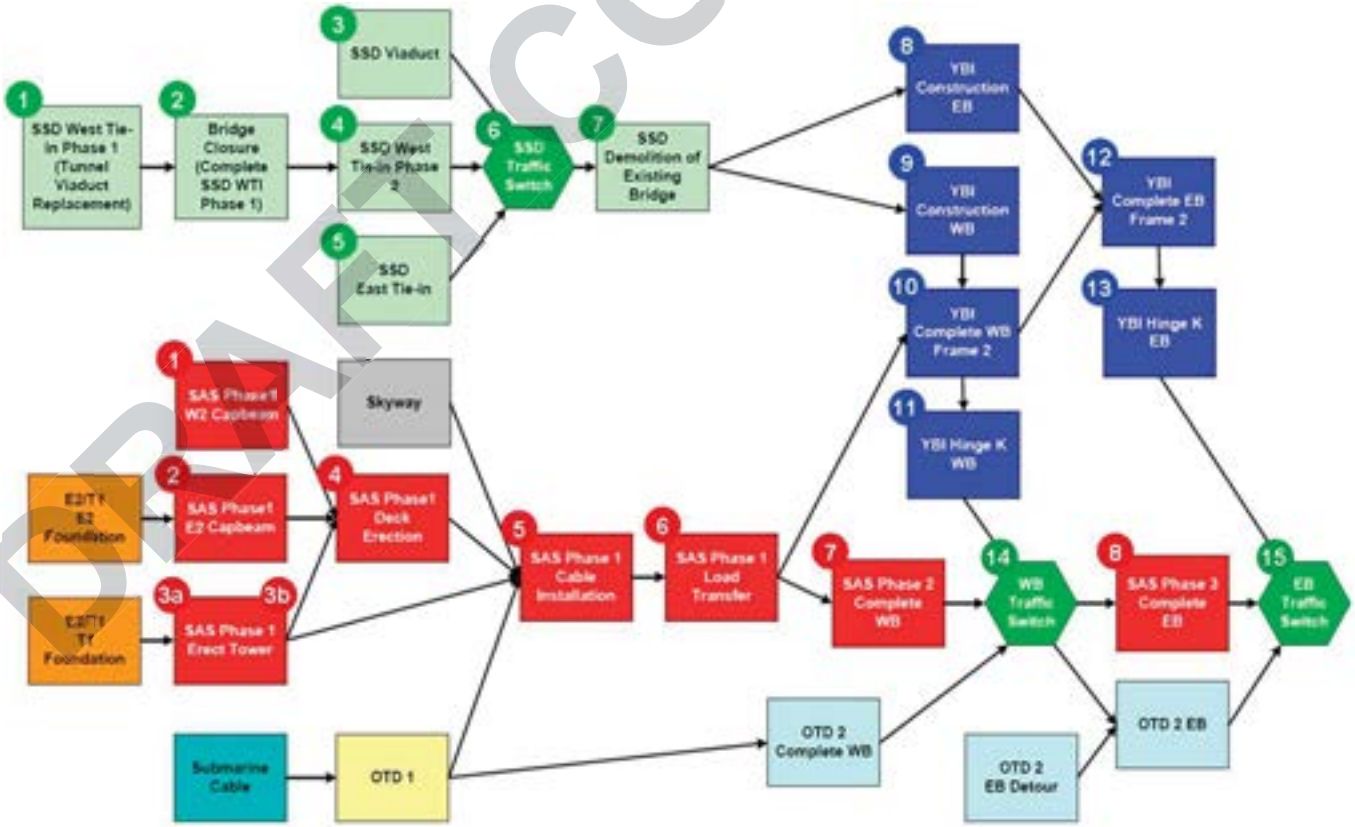
APPENDIX
Draft Concept of Program Summary Report

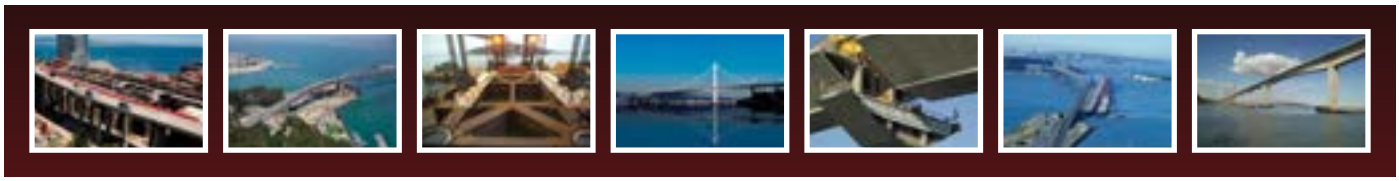


1. STATUS UPDATE - 4/2/2007

Month's Highlights: *(Ref: TBSRP and RM1, Monthly Progress Report, January 2007 Draft)*	Goal 1: Schedule to Seismic Safety ✓ Current Schedule vs. Opportunity Schedule ✓ bullet 2 Goal 2: Communications and Outreach ✓ bullet 1 ✓ bullet 2 Goal 3: Finance ✓ Capital Outlay Support Budget ✓ bullet 2
Request for TBPOC Action(s):	✓ TBSRP Strategic Plan (Approval) ✓ Protocol for Program Schedule Forecast Changes (Approval) ✓ Dumbarton/Antioch – TBPOC Role (Information) ✓ 2007 Legislative Update Meeting Preparations (Information)

2. EAST SPAN INTERDEPENDENCIES





3. YERBA BUENA ISLAND - CURRENT vs. OPPORTUNITY SCHEDULE

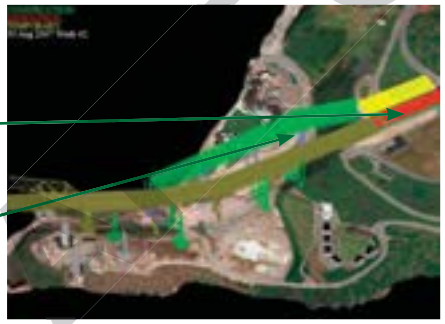
CURRENT SCHEDULE
Description (Date)

SSD West Tie-in Phase 1 (Tunnel Viaduct Replacement)
1

SSD West Tie-in Phase 1 (Tunnel Viaduct Replacement)
1

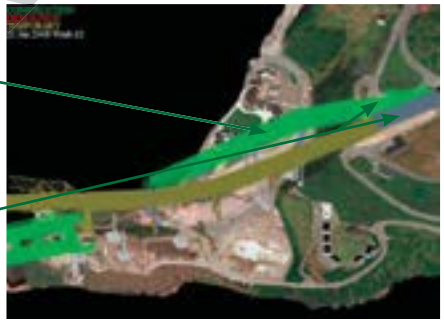
Bridge Closure (Complete SSD WTI Phase 1)
2

SSD Viaduct
3



SSD Viaduct
3

SSD West Tie-in Phase 2
4



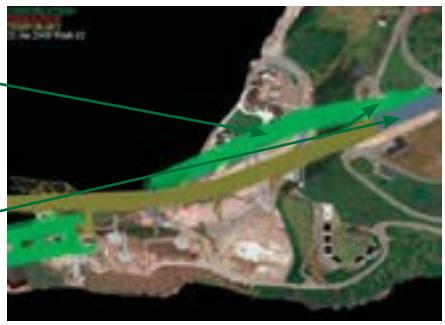
OPPORTUNITY SCHEDULE
Description (Date)

SSD West Tie-in Phase 1 (Tunnel Viaduct Replacement)
1

SSD West Tie-in Phase 1 (Tunnel Viaduct Replacement)
1

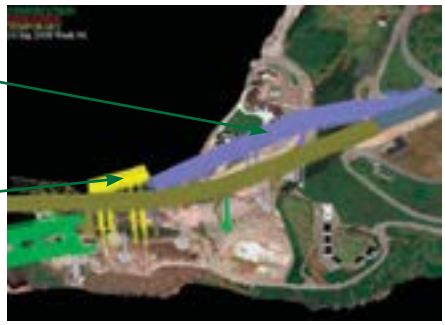
SSD Viaduct
3

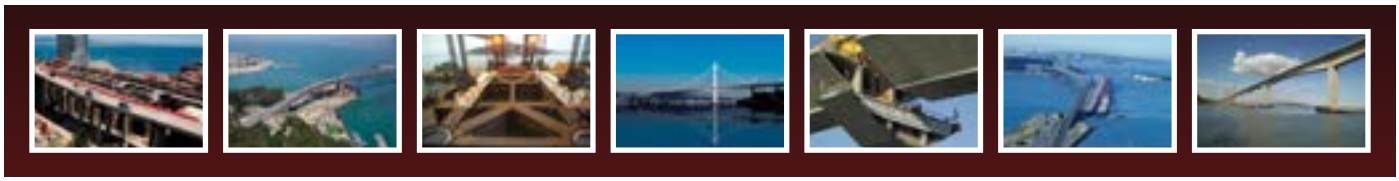
SSD West Tie-in Phase 2
4



SSD Viaduct
3

SSD East Tie-in
5





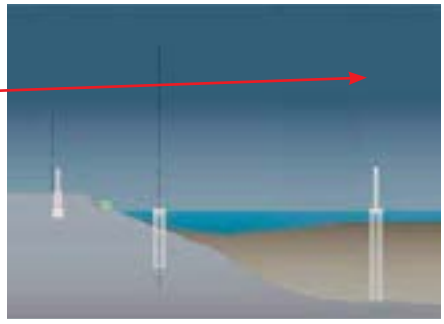
4. SELF ANCHORED SUSPENSION - CURRENT vs. OPPORTUNITY SCHEDULE

CURRENT SCHEDULE

Description (Date)

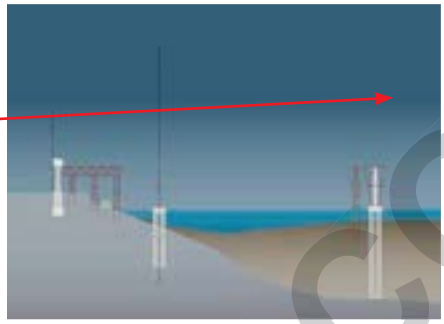
SAS Phase 1 W2 Capbeam

1



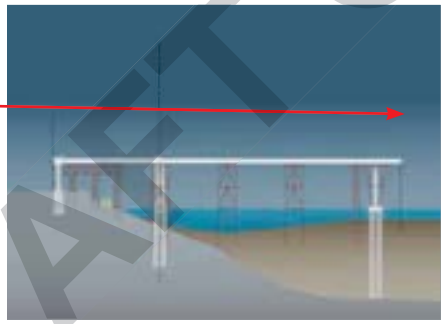
SAS Phase 1 W2 Capbeam

1



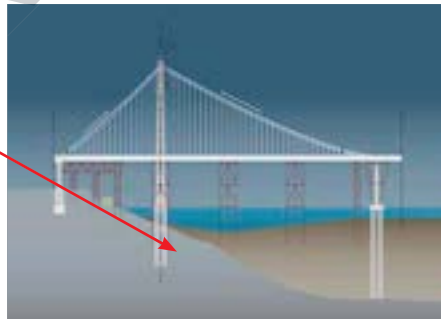
SAS Phase 1 E2 Capbeam

2



SAS Phase 1 Erect Tower

3a



OPPORTUNITY SCHEDULE

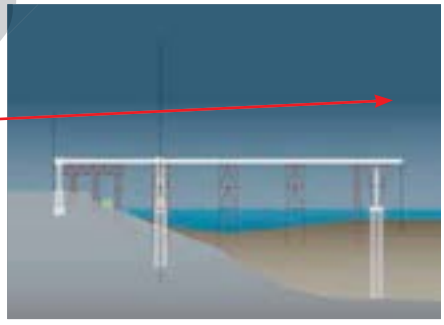
Description (Date)

SAS Phase 1 W2 Capbeam

1

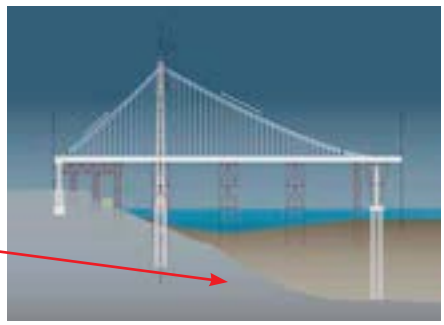
SAS Phase 1 W2 Capbeam

1



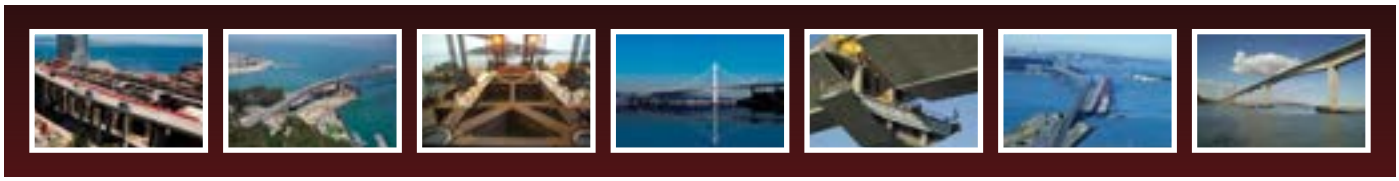
SAS Phase 1 Deck Erection

4



SAS Phase 1 Erect Tower

3b

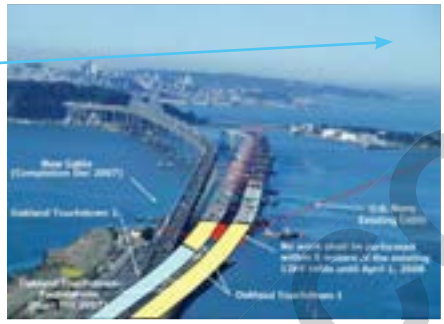


5. OAKLAND TOUCHDOWN - CURRENT vs. OPPORTUNITY SCHEDULE

CURRENT SCHEDULE
Description (Date)

OTD 1
1

OTD 1
1



OTD 2
Complete WB
2

OTD 2 EB
4

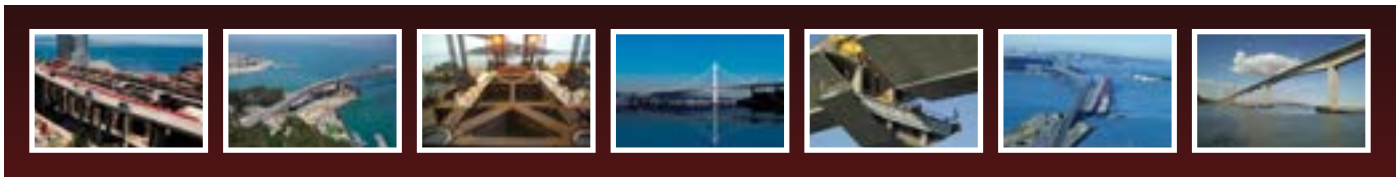
OPPORTUNITY SCHEDULE
Description (Date)

OTD 1
1

OTD 1
1

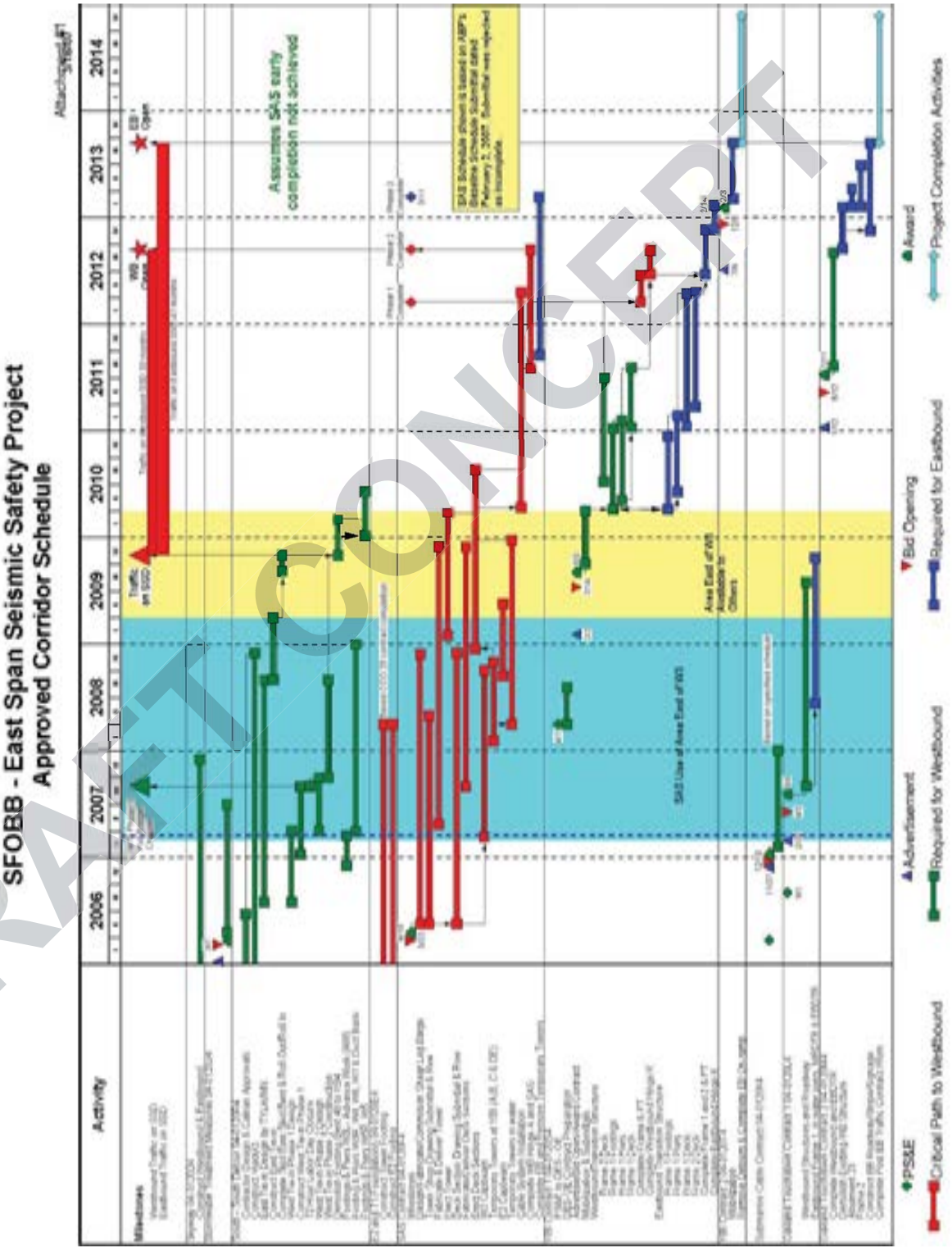
OTD 2
EB Detour
3

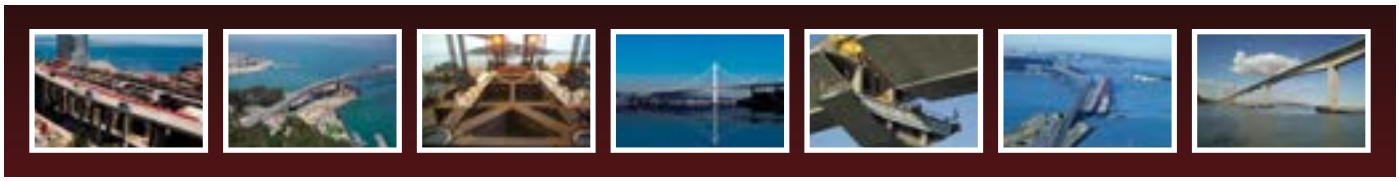
OTD 2 EB
4



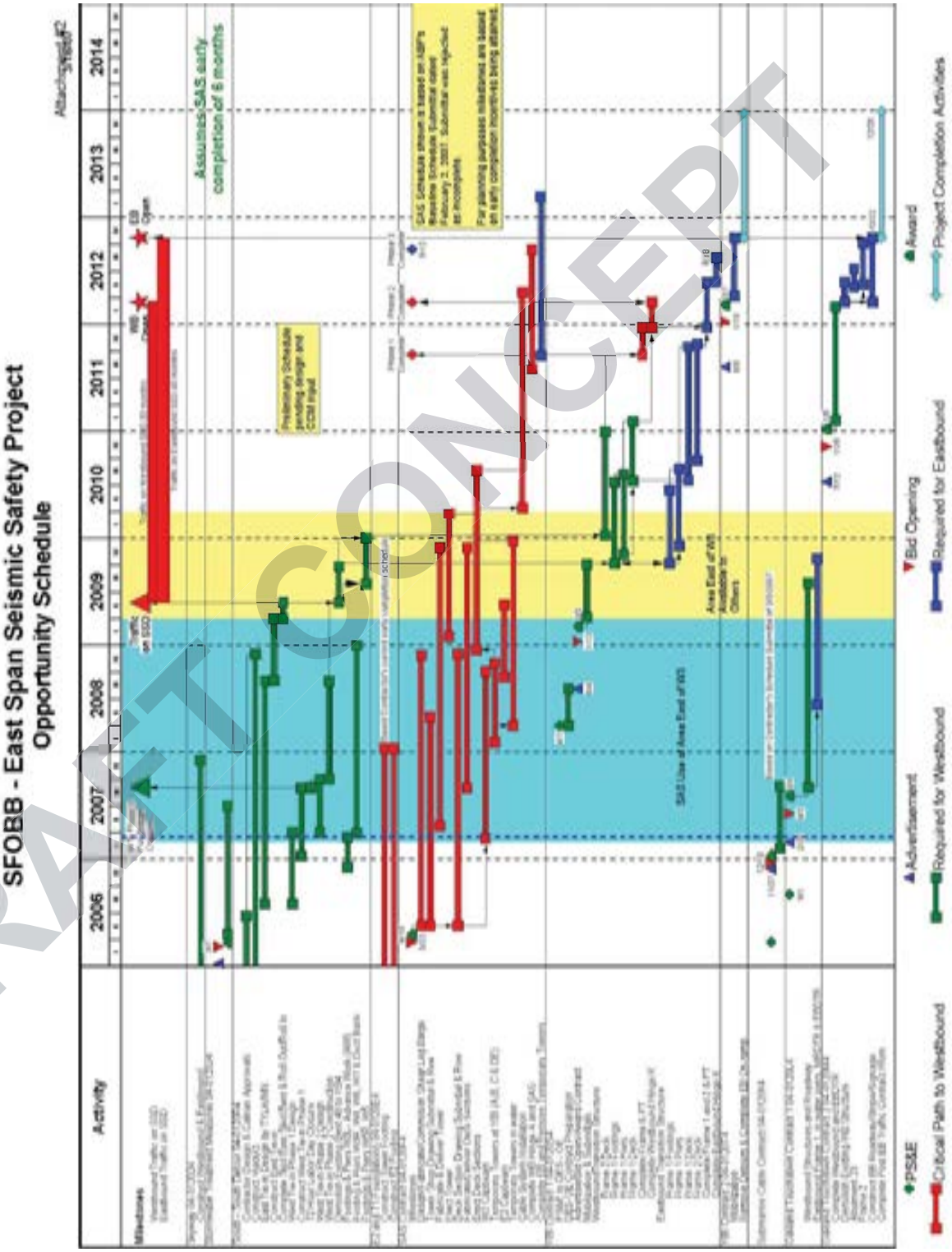
6. CURRENT SCHEDULE

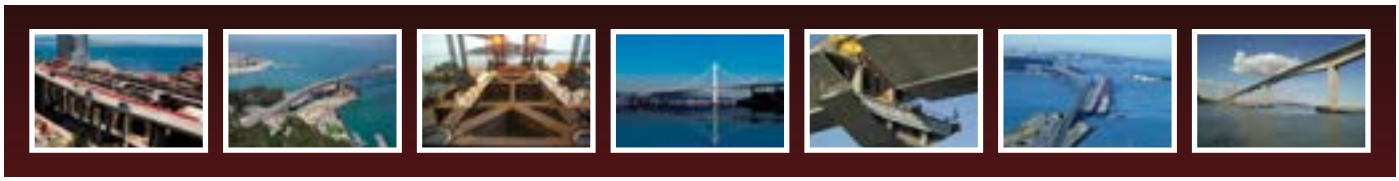
1st Quarter Report (DATE HERE), Toll Bridge Seismic Retrofit Program





7. OPPORTUNITY SCHEDULE

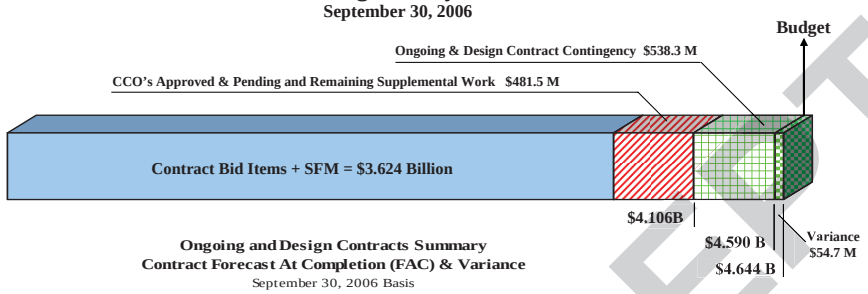




8. BUDGET STATUS - CAPITAL OUTLAY

As of January 1, 2007

TBSRP Ongoing and Design Contracts Summary
Budget Analysis
September 30, 2006

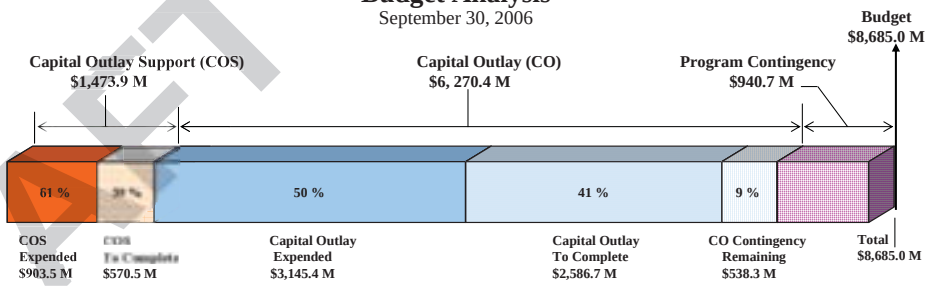


Ongoing and Design Contracts Summary
Contract Forecast At Completion (FAC) & Variance
September 30, 2006 Basis

Contract Bid Items	$	3,586,589,517
State Furnished Materials (SFM)	$	37,922,081
Subtotal	$	3,624,511,598
Supplemental Work Remaining	$	112,519,321
CCO's		
CCO's (Approved (424) + Pending (107) = Total (531))	$	357,734,420
CCO's = or > $1Million Pending POC's approval (05)	$	11,212,391
Subtotal	$	4,105,977,730
Ongoing and Design Contract Contingency	$	538,271,370
Total	$	4,644,249,100
Variance (Total - Current Budget)	$	54,689,100
Total Current Ongoing and Design Contract Budget	$	4,589,540,000

Confidential Draft – For Deliberative Purpose Only

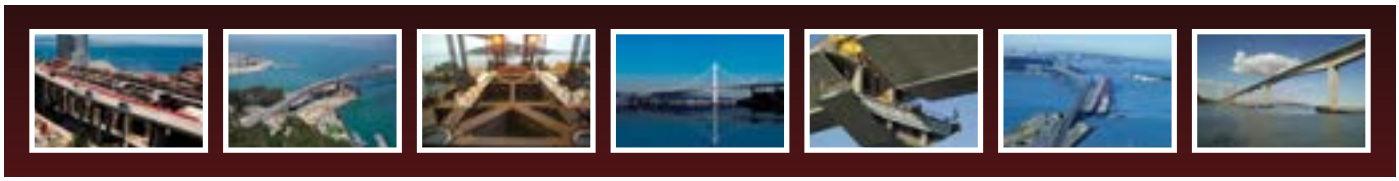
Toll Bridge Seismic Retrofit Program
Budget Analysis
September 30, 2006



Toll Bridge Seismic Retrofit Program
Budget Forecast At Completion (FAC) & Variance
Third Quarter 2006 Report Basis

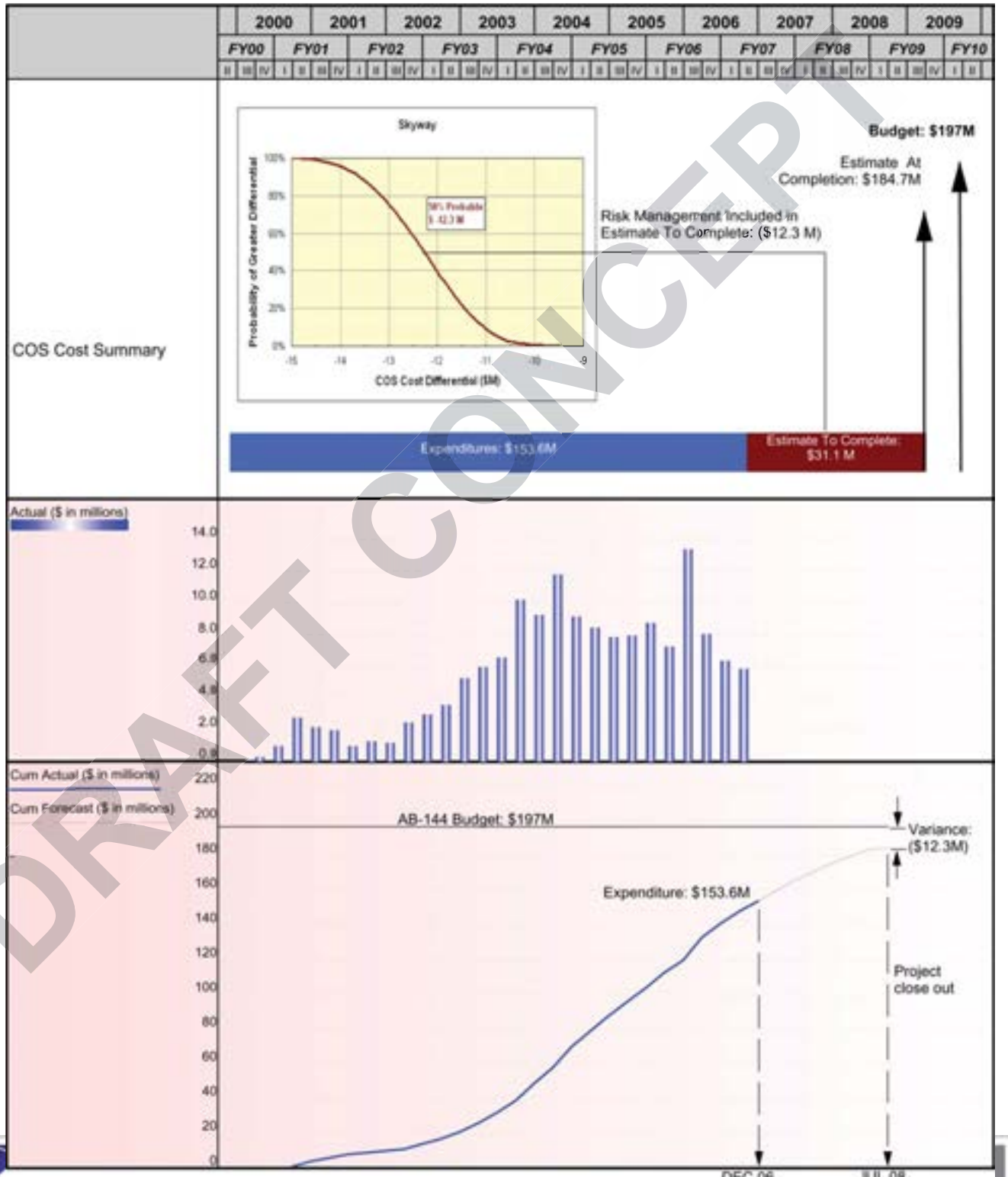
Capital Outlay Support		
Capital Outlay Support Expended	$	903,451,876
Capital Outlay Support To Complete	$	570,448,124
Total Capital Outlay Support	$	1,473,900,000
Capital Outlay		
Capital Outlay Expended	$	3,145,371,958
Capital Outlay To Complete	$	2,586,756,672
Capital Outlay Contingency Remaining	$	538,271,370
Total Capital Outlay	$	6,270,400,000
Program Contingency	$	940,700,000
Total Toll Bridge Seismic Retrofit Program	$	8,685,000,000
Variance (Total - Current Budget)	$	-
Total Toll Bridge Seismic Retrofit Program Budget	$	8,685,000,000
Reported Total In 3rd Quarter 2006 TBSRP Report	$	8,685,000,000

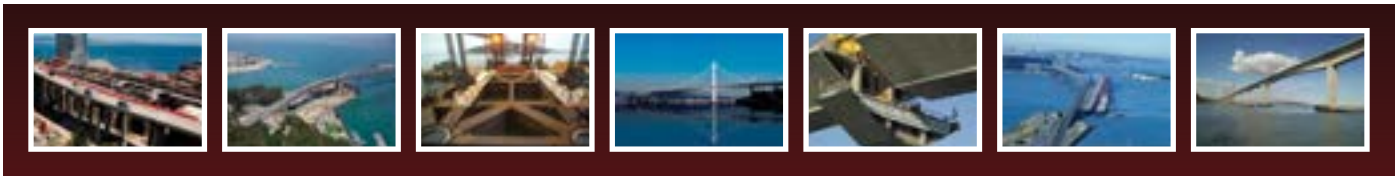
Confidential Draft – For Deliberative Purpose Only



9. BUDGET STATUS - CAPITAL OUTLAY SUPPORT

As of January 1, 2007





10. TBPOC DECISIONS TO DATE

Date	Decision
10/25/06	Richmond-San Rafael Bridge SRP – Approval to change approved budget with a transfer of $89 million in project cost savings to the SRP contingency.
7/27/06	Monthly Progress Reports – Approval authority to PMT members to approve the monthly progress reports starting with the August 2006 Monthly Progress Report after appropriate reviews by the TBPOC.
7/27/06	Protocol for Program Budget Forecast Changes – Approval of protocol for revisions to forecast cost data for Quarterly Report.
6/29/06	PS&E – approval of Plans Specifications and Estimate. Approved through the PMT.
3/23/06	BATA Adoption of Seismic Budget – Approval of draft memorandum and resolution.
3/23/06	Bay Bridge Website – Approval to launch the Bay Bridge Website.
3/23/06	TBPOC April 20 Meeting – Suggestion to move the April 20 meeting in Sacramento to April 18 which may coincide with the SAS contract award in San Francisco.
2/23/06	Bay Bridge Communications Alternate Media Spokespersons – Approval of memo regarding alternate media spokesperson.
2/23/06	Small Business/DVBE Requirements – Approval to meet with local business representatives.
2/23/06	BATA/Caltrans Co-op Agreement – Approval to delegate to the Department and BATA approval of the co-op agreement.
12/29/05	Carquinez Bridge Demolition – Approval for district Director Sartipi to work with the Crockett officials on the "Retirement of the Bridge Event."
11/21/05	SFOBB East Span Joint Test Funds – Approval to pay back the RM1 Program for use of RM1 funds to test reliability of the joint design under high traffic volumes on the I-80 approach to the Carquinez Bridge.
11/21/05	Bay Bridge Identity Logo – Approval for use on the website and on stationery, but for any other use, especially in paid public information campaigns, future TBPOC approval is required.
11/21/05	Resources for CTC – Approval to hire 2.5 PY's immediately.
10/28/05	Agreement on Committee Procedures – Approval of the agreement that outlines the roles and responsibilities for the committee members in carrying out the work of the TBPOC.
10/28/05	PMT – approval of the structure and membership of the PMT.
8/24/05	Richmond-San Rafael Bridge – Approval to proceed with negotiations on outstanding claims for a not-to-exceed amount as discussed.

Appendix D

THE SAN FRANCISCO-OAKLAND
BAY BRIDGE
SEISMIC SAFETY PROJECT
CALTRANS BAY AREA TOLL AUTHORITY CALIFORNIA TRANSPORTATION COMMISSION

BAY BRIDGE DETOUR TIE-IN

STAKEHOLDER AND MEDIA OUTREACH ACTION PLAN

Labor Day Weekend, September 4-7, 2009

OVERVIEW

This report outlines the proposed outreach elements that will be implemented to inform stakeholder entities and the public about upcoming work on the Bay Bridge Detour Tie-In, as part of the Bay Bridge Seismic Safety Projects. The outreach effort for this operation will build upon the successes and lessons learned from the previous operations on the West Approach and YBI Viaduct Replacement, both requiring full deck closures of the Bay Bridge. Leveraging these past successes, Caltrans will expand coordination with East Bay cities and counties, conduct advance planning with event venues, distribute information to statewide audiences, and target Labor Day Weekend travelers into and out of the Bay Area.

Digital rendering of Tie-In

SECTION ONE
CRITICAL TALKING POINTS
Closure Overview

On Labor Day weekend 2009 the San Francisco – Oakland Bay Bridge will be closed in both eastbound and westbound directions to facilitate crucial seismic retrofit work.

Although the closure period is similar to previous work performed on the YBI Viaduct in 2007, this operation is different. It will involve the construction of skid bents and the erection of trusses prior to closing the existing bridge to traffic.

Once the existing bridge is closed to all motorist traffic, it will be cut on both ends, lifted and rolled out. Then the new Tie-In will be rolled in, lowered and the expansion joints will be installed. The new detour structure will then be ready to be opened for traffic. Caltrans will then demo the existing bridge and remove the skid bents.

Caltrans has estimated that this work can be completed during the 3-day closure over the Labor Day weekend. Because the nature of this work does not allow for a contingency reopening of the bridge motorists are strongly advised to plan to use alternate routes and transportation on Tuesday, as the Bay Bridge may not be available due to unforeseen circumstances.

The Bay Bridge project team expects to conclude this construction operation on time. Once the operation has begun the bridge can not be reopened to traffic until the work is complete. Transportation alternatives will be in place should unanticipated delays occur causing the bridge to remain closed beyond Tuesday morning.

Access & Transportation Alternatives

During the closure access between San Francisco and YBI and Treasure Island will be maintained. A lane will be dedicated in both the eastbound and westbound directions on the West Span of the Bay Bridge that connects San Francisco with YBI.

MUNI Service to Treasure Island (Line 108), including overnight service, will not be affected.

A Public Information Office will be established on Treasure Island to serve as a primary point of contact for YBI and TI residents, businesses, and agencies.

Caltrans will coordinate on an ongoing basis with BART, AC Transit, MUNI, Golden Gate Transit, Samtrans, Vallejo Ferry, Alameda/Oakland Ferry, Caltrain, Greyhound and Amtrak to determine and plan any necessary schedule or route changes, and to include transit agencies in the operational planning for the upcoming lower deck closures.

The Bay Area Rapid Transit system will operate around the clock in selected stations.

Ferry service on selected routes will be augmented.

Caltrans is coordinating with transit providers to plan alternative routes for the weekend closure.

The MTC 511 system will serve as the primary resource for trip planning and up to date traffic information. Revised transit schedules will be available through 511.

Daily communication will be maintained with other bridges (Golden Gate, San Mateo-Hayward, Dumbarton, Richmond-San Rafael) on traffic and operational progress during the closures.

Early Bridge Damage

Outreach & Public Communication

A substantial public outreach campaign is planned to inform motorists, residents and businesses about the Labor Day weekend bridge closure. This outreach effort will build upon the successes of the previous operations on the West Approach and YBI Viaduct requiring full deck closures of the Bay Bridge.

Leveraging these past successes, Caltrans will expand coordination with East Bay cities and counties, conduct advance planning with event venues, distribute information to statewide audiences, and target Labor Day Weekend travelers into and out of the Bay Area.

Bay Area elected officials and media will receive early notice of the announcement regarding the 2009 Labor Day Weekend closures. Immediately after, the Public Information Team will begin a massive outreach effort targeting motorists, transit riders, holiday travelers into and out of the Bay Area, and affected residents and industries.

Media will be updated continuously of progress by press releases, construction information and graphics, and during the weekend closure, construction site access and live PIO updates.

BayBridgeInfo.org will be the nexus for construction updates and information, and 511 will be referenced as the official source for trip planning and traffic conditions.

Changeable message signs will be used to inform motorists about the upcoming closures in the Bay Area region, and where appropriate throughout northern and southern California.

A Telephone hotline will be maintained throughout the closures.

SECTION TWO
ELECTED OFFICIALS OUTREACH

Caltrans will inform elected officials directly, regarding the upcoming Bay Bridge Closures.

2.1 Outreach Meetings

Caltrans will provide multimedia presentations to project stakeholders on the upcoming work. Elected officials from the Bay Area will be invited to presentations given by the Bay Bridge Spokesperson, Bart Ney, and East Span construction staff in April, 2009 (up to 21 weeks in advance of the closures). Invitations will be extended to the offices of Senators Boxer and Feinstein, all members of the Bay Area Congressional delegation, all Bay Area State Senators, all Assembly members from the Bay Area, as well as Supervisors in all nine Bay Area counties, and mayors in key Bay Area cities. Caltrans staff will also contact the affected Transportation Authorities, Mayor's Offices, and the Metropolitan Transportation Commission/Bay Area Toll Authority Commission. Graphics and informational fact sheets will be distributed.

2.2 E-Alert

Electronic alerts will be sent to all elected officials and staff contacts, providing information on the upcoming demolition and link to a Fact Sheet which could be viewed electronically, shared, or printed in hardcopy. The first notification will serve as advance notice, and a second E-Alert will serve as a reminder a few days prior to the beginning of the operation.

SECTION THREE
MEDIA OUTREACH

Caltrans will inform the media prior to, during and after all major elements of the work.

3.1 Media Outreach Sessions

Media in the San Francisco Bay Area and in surrounding media markets will be invited to an educational outreach session during April 2009, up to 21 weeks in advance of the upcoming work. Separate media outreach sessions will be held in Sacramento or Southern California upon direction from the POC. Graphics, video, and informational Fact Sheets will be distributed. These sessions are intended to raise media awareness, inform media of upcoming work, provide current contact information, foster collaborative working relationships and solicit feedback on how to improve our outreach.

3.2 Press Releases

Caltrans will distribute a general press release prior to the weekend closures. A media press release will be issued at the completion of the operation to keep media updated on the completion and re-opening of the Bay Bridge.

3.3 Public Information Officer Live Update

The Caltrans Bay Bridge Public Information Officer (PIO) will be on site throughout the weekend operation. A media hold location will be made available throughout the weekend at an appropriate location that provides an exclusive view of the operation. Live updates to the media will be facilitated at this location. Caltrans will develop talking points ahead of time and construction staff will provide real-time construction updates to the PIO for sharing with media.

SECTION FOUR
PUBLIC OUTREACH

Caltrans will inform the public through a broad outreach campaign designed to inform as many potential weekend users of the Bay Bridge as possible. The targeted user groups will include Bay Area motorists, regional commuters, goods movement industries, out-of-town holiday travelers, the general public and immediate neighborhood residents. Notices will be provided months in advance in some cases.

4.1 Public Service Announcements

Paid public service announcements will run in television, print, radio, online and movie theater media to share information with the general public three to four weeks in advance of the beginning of work. Markets throughout the state will be targeted. Detailed graphics will be included in the messaging to help show the public the work that will be performed. Messaging will focus on keeping traffic away from the bridge approaches and encourage motorists to seek alternative transit and driving options.

4.2 Website

All outreach materials will direct stakeholders to the BayBridgeInfo.org website for daily information and updates about the work, and the associated ramp and deck closures. This includes graphical and text information on the work and the schedule; information on the transit alternatives available, including links to each transit operator and to 511; links to radio and television announcements, and other informational materials. The website

includes a comment form for users to send questions or feedback 24 hours/day as well as contact phone and address information for the Public Information Office and telephone hotline.

4.3 External Website Information

Outreach efforts for the 2009 closure will focus heavily on increasing avenues of electronic communication. Key websites will be targeted in the industries of travel, sports and events venues, informational sites and community boards. Methods of communication include links and general information of closure dates and alternative forms of transportation.

Travel Sites: Links on partner websites in the travel industry: AAA, All major airlines flying into SFO and Oakland Airports, major booking sites (i.e.-Expedia, Orbitz, Travelzoo, etc.) and a link on the California Welcome Center website.
Sports Team Websites: Information and BayBridgeInfo.org link on local sports team websites to include: the San Francisco Giants, the San Francisco 49ers, the Oakland As, the Oakland Raiders, the Golden State Warriors and the San Jose Sharks.
Sports/Event/Venue Sites: Information and our website link on sites where the public goes to purchase tickets to sports, concerts and theater events. These would include: Ticketmaster, Livenation, and StubHub.
Community Message Boards: Posting information and internal website link on craigslist.org, a heavily-trafficked local site in the Bay Area and other cities, and sites that list local events such as OnlyinSF.com and SFGuide.com.
Wikipedia.org: Caltrans will update this site with closure information.
GPS/Mapping Sites: Caltrans will research incorporating information and an internal web link on sites that provide traffic mapping and directions such as Google maps, Yahoo maps and Mapquest. There will also be research into possible coordination with sites that link traveler's GPS systems such as OnStar, TomTom and Garmin.

4.4 Public Venues and Events

Caltrans will coordinate with street closure permit offices to distribute information at street fairs and events such as the San Francisco North Beach Festival, Union Street Fair and the Stern Grove Concert Series.

4.5 Mailers and Flyers

Caltrans will develop informational materials, including a Fact Sheet, for distribution electronically, through the mail and at public locations near the upcoming work. The Fact Sheet includes dates and times of work and the associated deck closures, the rationale for conducting this operation over Labor Day Weekend, transit and driving alternatives, as well as background information on the Bay Bridge Seismic Safety Projects.

Distribution
Where possible, Caltrans will coordinate with the following entities to provide electronic Fact Sheets for distribution to their constituents:

- Local/corridor businesses
- Neighborhood newsletters and other publications
- Treasure Island Development Authority and Mayor's Office staff
- Residential neighbors, including all Treasure Island/YBI residents
- Taxis and shuttle services, airports, hotels, car rental agencies, visitor's bureaus, the State Tourism Office, Chambers of Commerce and automobile associations

- Hospitals, major employers, funeral homes, farmers' markets associations, carpool centers, parking garages, malls
- Major regional and local entertainment and sports venues for the SF 49ers, the Oakland Athletics, the SF Giants, and the Oakland Raiders. Caltrans will also contact university sports venues, including UC Berkeley, Stanford, and local Cal State campuses, regarding home games over the Labor Day weekend.
- Cities from San Luis Obispo to Sacramento in the target market areas (Bay Area, Central Valley, Southern California, Sacramento)
- Ferry operators, bus transit and rail operators, transit centers, Bay Area Rapid Transit, the Water Transit Authority, and the San Francisco Metropolitan Transportation Agency
- San Francisco Municipal Railway (MUNI)
- State and local offices of the California tourism agencies and convention bureaus
- Approximately 5,000 organizations and private citizens on the Bay Bridge Public Information Office contacts list
- Festival associations and city permit offices
- Area attractions (zoos, museums, etc)
- Labor and credit unions (CTA, CALPERS, etc)
- Area school districts
- Car rental agencies
- The Department of Motor Vehicles
- Weigh stations for semi trucks coming into the area
- Community groups for Seniors such as AARP, Knights of Columbus, the VFW, etc.

4.6 Social Media

Social media on the Web has become a fundamental source for many to interact and receive their news and information.

Social adaptation for the upcoming closure can be further enhanced by focusing on key distribution points, electronic and viral forms of communication. Examples of this include: Twitter, Facebook, Flickr, and building on relationship with Google, Selecting key websites lo link with BayBridgeInfo.org will reach a greater audience with less effort.

4.8 Bay Bridge Newsletter

The Bay Bridge PIO will produce a newsletter prior to the closure for electronic distribution. Recipients of this will come largely from a large database of contacts consisting of elected officials, key stakeholders, Bay Area businesses, project staff and community partners and residents.

4.9 Banners

Caltrans will post banners at multiple locations to guide the public on where to go for more information on the upcoming work and motorist impacts. The banners will be posted in advance and will point motorists and the public to the BayBridgeInfo.org website, and 511.

4.10 Local Notification

Presentations and notices will be given to Treasure Island residents and any other residential or commercial locations that might be specifically affected by access restrictions, noise, dust, and vibration. The 24-hour telephone hotline also serves to provide nightly construction updates and receive questions and comments.

4.11 Telephone Hotline

Caltrans provides a telephone hotline at the Public Information Office for motorists to receive daily updates on construction-related lane and ramp closures and other construction information, and for local affected residents and businesses to have direct contact with PIO staff. The hotline will be staffed for extended hours during the weeks leading up to and throughout Labor Day Weekend.

4.12 Changeable and Electronic Message Signs (CMS's)

Caltrans will engage a statewide network of electronic and changeable message signs two weeks prior to the closures to alert motorists. Signs will be especially intensive in the Bay Area; Caltrans will work closely with Districts throughout the state to ensure that the message will be highly visible along major thoroughfares.

4.13 Highway Advisory Radio (HAR)

The Bay Bridge Public Information Team will script the message and provide it to the Caltrans operations unit for posting on the HAR frequencies. Caltrans promotes the HAR on the banners posted within range of the HAR frequency.

4.14 E-Alert

Similar to the E-Alert sent to elected officials, an electronic alert will be sent to the general public. Thousands of project contacts will receive the E-Alert well in advance of the closures, providing information on the upcoming demolition and linking to a Fact Sheet which could be viewed electronically, shared, or printed in hardcopy. An additional (reminder) E-Alert will be sent a few days before the closure.

4.15 Out-of-town Traveler Notification

Caltrans will focus additional efforts to target out-of-town travelers visiting the Bay Area during the Labor Day Weekend, who might be impacted by the Bay Bridge closure. Many elements of the outreach plan will be implemented earlier than in past efforts, and extended to additional metropolitan regions in California. Visitor Bureaus, recreational venues, and other traveler services will be included in all possible aspects of the outreach plan. Information will be distributed to hundreds of California cities, the Weather Channel and on the California Department of Tourism website. Information kiosks at major airports in the Bay Area throughout the four-day operation will provide information.

4.16 Transit Agency Coordination

Caltrans will coordinate on an ongoing basis with BART, AC Transit, MUNI, Golden Gate Transit, Samtrans, Vallejo Ferry, Alameda/Oakland Ferry, Caltrain, Greyhound and Amtrak to inform transit riders of the upcoming lower deck closures. Each of the agencies will distribute information to riders and staff. In addition, MUNI buses will display placards. Throughout the Labor Day Weekend operation, daily updates will be given to the other bridges (Golden Gate, San Mateo-Hayward, Dumbarton, Richmond-San Rafael) on traffic and operational progress.

4.17 MTC 511 Coordination

Caltrans will continue to collaborate with MTC staff responsible for the 511 Transit Information system on the upcoming work and the changes to transit schedules as a result of the closures. MTC incorporates the revised schedule information on their voice-activated system and the MTC 511 (www.511.org) website. Furthermore, MTC posts a graphic banner announcing the Bay Bridge Construction and Closures on the homepage pointing users to BayBridgeInfo.org for information.

Caltrans will make use of MTC's informational kiosks at locations such as the Embarcadero BART Station and the Baycrossings Store at the Ferry Building as an additional method of communication.

4.18 Department Informational Letter

Caltrans distributes an informational fact sheet electronically to District 4 staff on the upcoming work. The Fact Sheet includes dates and times of work and the associated closures, as well as transit and driving alternatives.

4.19 Coordination with other Caltrans Districts

Caltrans works with other Districts to extend messaging on key highway Changeable Message Signs in those districts, as well as in distributing Fact Sheets to all District staff.

4.20 Building on Past Successes/Streamlining

The successful outreach efforts in the closure years of 2006 and 2007 will lend itself to efficiency gains for 2009. Reduction in paper costs (printing) and labor (fewer community presentations) are two examples of this.

SECTION FIVE
CALTRANS INTERNAL COORDINATION

5.1 Command Center

Caltrans staff will continue to hold regular meetings to review ongoing public issues relating to the project. During the operation, a Command Center equipped with computers, television monitors, workspaces and meeting space will be established for all key agencies to be able to work on site and coordinate closely together.

5.2 District 4 Coordination

Public Affairs Office

The Bay Bridge Public Information staff communicates regularly with the District 4 Public Affairs staff to help ensure that district staff is informed and to identify potential areas for collaboration.

District Director's Office

Presentations on the public outreach strategy and implementation elements will be made to the District Director and Director's Staff as directed.

Traffic Operations

Caltrans holds intermittent meetings between key District operations staff on all of the projects along the Bay Bridge Corridor. The Traffic Management Center addresses the anticipated needs of the operation by joining the Command Center, and by assisting on the public outreach effort through the operational elements, such as Changeable Message Signs.

5.3 Agency and Executive Staff

CT Headquarters, including the Director and the TBPOC agencies, are given a presentation on the scope and impacts of the work prior to the beginning of work. The TBPOC will review the Outreach Action Plan in April 2009. Caltrans Headquarters (Lane Closure Review Committee) will be briefed in April 2009. Regular communications and updates on the public outreach strategy and implementation will be made to the Public Affairs Office, the Caltrans Director and Director's Staff.

SECTION SIX
PROPOSED PRESENTATION CALENDAR

April 2009	POC Approval of Outreach Plan
	District Executive Staff Presentation
	Caltrans Lane Closure Review Committee Presentation
	BATA Commission Presentation
	Elected Officials Legislative Outreach Meetings
	Media Outreach Meeting
	Key Stakeholder Presentations (Including TIDA, CCSF, SF Giants, Oakland A's, UC Berkeley (Cal) Football, Oakland Art & Soul Festival, Golden Gate Bridge, Cities of Hayward, Marin, Larkspur, San Rafael, County Transportation Authorities)
	Transit Agency Coordination Begins
	External website strategy planning
May 2009	Telephone Hotline
	First E-Alert distributed to Bay Bridge contacts on May 5
June - July 2009	Website updates
	Second E-Alert distributed to Bay Bridge contacts on June 9
	E-Alert and flyers to Bay Bridge contacts, including Treasure Island/YBI residents, taxis and shuttle services, airports, hotels, car rental agencies, visitor's bureaus, Chambers of Commerce, hospitals, major employers, entertainment venues, city and county governments, transit, and tourism agencies
	Transit Ridership Outreach
	MTC/511 Coordination
	Caltrans Employee Notification
	Third E-Alert distributed to Bay Bridge contacts on July 7
August 2009	Fourth E-Alert distributed to Bay Bridge contacts on August 4
	Public Service Announcements and online campaign begin
	E-Alert to Elected Officials

	Banners posted
	Electronic Message Signs and HAR begin
	Media Advisory
	Fifth & final E-Alert distributed to Bay Bridge contacts on Aug. 25
Labor Day Weekend 2009	Weekend site access for media
	PIO Live Updates
	Press Release announcing re-opening of Bay Bridge