State of California
DEPARTMENT OF TRANSPORTATION

Business, Transportation and Housing Agency

Memorandum

To: CHAIR AND COMMISSIONERS

CTC Meeting: September 15, 2004

Reference No.: 4.4
Information Item

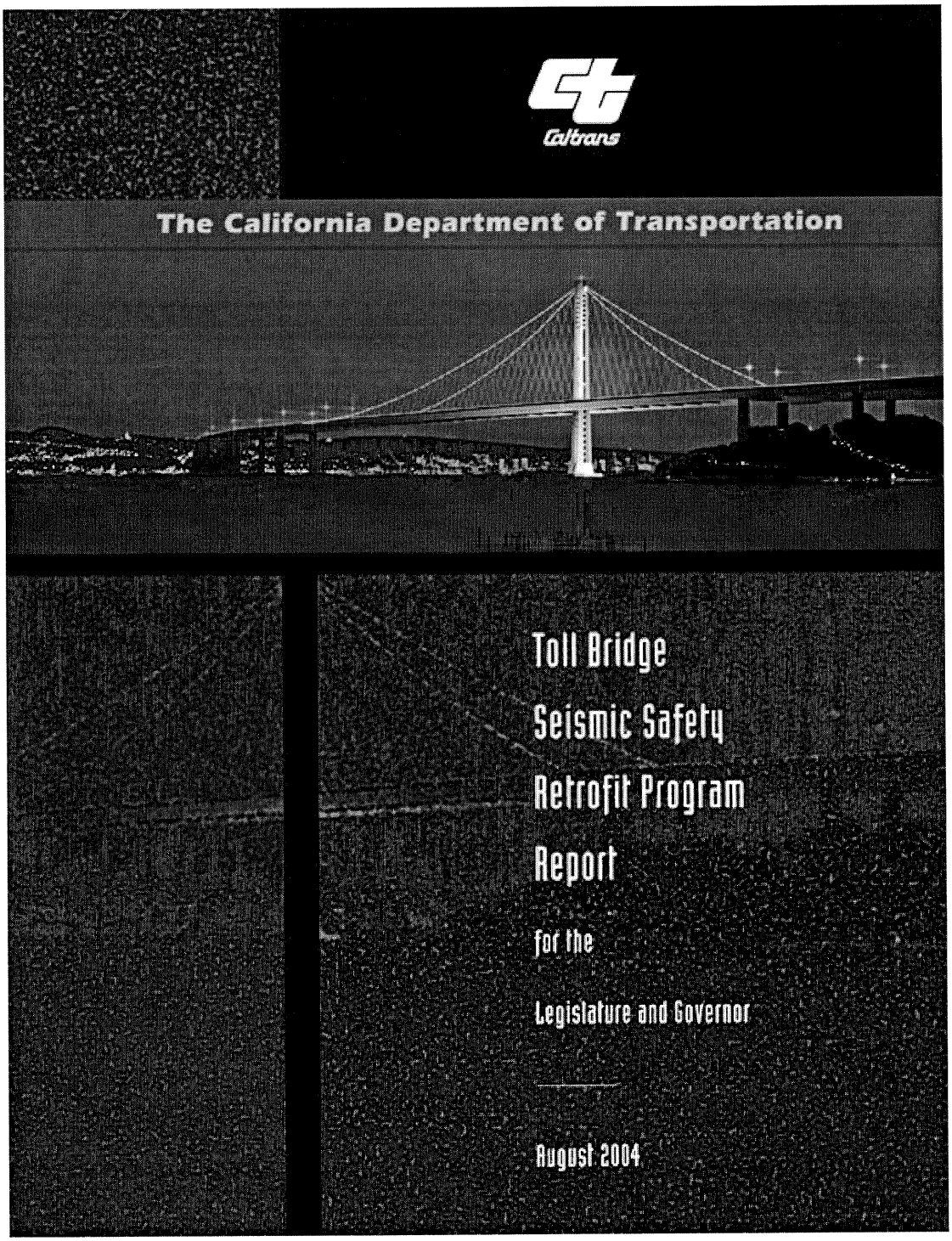
From: CINDY MCKIM
Chief Financial Officer, Acting

Prepared by: Carl Haack
Division Chief
Project Management

Ref: **REPORT ON ESTIMATED/ACTUAL COST TO RETROFIT THE STATE'S SEVEN TOLL BRIDGES**

Attached is the California Department of Transportation's *Toll Bridge Seismic Safety Retrofit Program Report* submitted to the Legislature and Governor in August 2004.

This item will be discussed at the September 15, 2004 California Transportation Commission meeting in Sacramento.


Caltrans
The California Department of Transportation
Toll Bridge
Seismic Safety
Retrofit Program
Report
for the
Legislature and Governor
August 2004

TOLL BRIDGE SEISMIC RETROFIT PROGRAM

Purpose

The purpose of this report is to inform the Legislature that the Toll Bridge Seismic Retrofit Program (Program) has a budget shortfall and to provide background regarding the increased costs for the San Francisco-Oakland Bay Bridge East Span (East Span) replacement.

Increased costs have been driven by several factors and complications, including: time delays related to selection of a signature bridge self-anchored suspension (SAS) span and the construction complexity of the SAS; insufficient initial analyses of costs; and external global cost escalation factors. The engineering design and cost estimates have been developed in consultation with respected outside experts. Bids received on the two major East Span contracts advertised since the passage of AB1171 (Dutra, Chapter 907, Statutes of 2001) have been significantly higher than the estimated costs for these contracts.

A funding solution is needed to continue the Program and complete the needed seismic safety projects of the two remaining critical bridges in the Program (Richmond-San Rafael and San Francisco-Oakland Bay Bridges).

In addition to funding, timing is an issue for new legislation. The Department of Transportation (Department) recommends that the new legislation be enacted during this session for the following reasons:

- The Department received a single bid for the Self-Anchored Suspension Bridge. That bid is set to expire on September 30, 2004. Legislation is needed to supplement the Program budget in order to continue the toll seismic retrofit effort and for the Department to award this bid. The contract cannot be awarded without legislative authority to expend the needed funds.

- If the bid expires, the contract will have to be readvertised and re-bid. This may result in a one-year schedule delay and significant escalation costs.

- Progress needs to continue toward completion of seismic safety for the toll bridges to minimize seismic event exposure, particularly for the existing East Span.

Senate Bills (SB) 60 and 226 (Kopp, Chapters 327 and 328, respectively, Statutes of 1997) set the decision-making authority and the original financing for the Program. Assembly Bill (AB) 1171 authorized the revision of the cost estimates for retrofitting the toll bridges included in the Program and provides the funding for their current cost estimates. In addition, AB1171 extended the seismic retrofit toll surcharge and provided a revised repeal date that would occur when the Department notifies the Secretary of State that sufficient funds have been generated to complete the Program.

This report provides the updated revenue and expenditure information, schedules, and cost estimates for each of the toll bridge projects within the Program. This report meets the requirements of Section 188.5(d) of the Streets and Highways Code:

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.

Cost Information

The cost estimate to complete the new east span is based on the low bid received on May 26, 2004 for the SAS contract, part of the East Span. The Program estimate is also based on economic impacts after 9/11 to the financial, bonding, and insurance markets; unprecedented materials and labor cost escalations since 2001; industry consolidation of suppliers, fabricators, and large construction project bidders; and contractors requesting additional time to complete these large projects, extending the program four years, resulting in additional engineering support costs and cost escalation.

The table below compares the AB1171 project estimates to current estimates.

Comparison of AB1171 and August 2004 Cost Estimates (Dollars in millions)

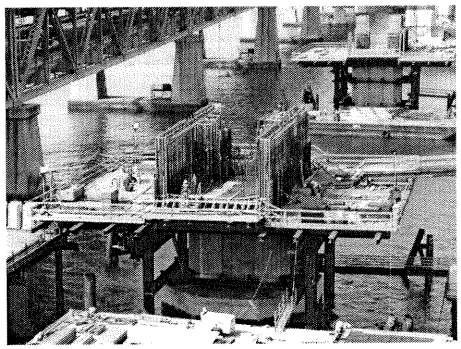
Bridge	AB1171	August 2004
Benicia-Martinez Existing*	$ 190	$ 180
Carquinez (eastbound)**	$ 125	$ 115
Richmond-San Rafael	$ 665	$ 914
San Mateo-Hayward	$ 190	$ 165
Vincent Thomas	$ 62	$ 59
San Diego-Coronado	$ 105	$ 105
Bay Bridge — West Span	$ 700	$ 737
Bay Bridge — New East Span	$ 2,600	$ 5,130
Total	$ 4,637	$ 7,405
Program Contingency* **	$ 448	$ 900

** This seismic retrofit project on I-680 was separate from the Regional Measure 1 (RM1) new toll bridge project currently under construction northbound, which is not part of the Program.*

***The westbound I-80 Carquinez Bridge was replaced by RM1 in 2004.*

**** AB1171 authorized the Department to utilize up to $448 million of the State Highway Account funds (using resources from the Interregional Transportation Improvement Plan, the State Highway Operation Protection Plan, or federal bridge funds) to mitigate any cost increases above the $4.637 billion budgeted Program cost estimate if needed.*

San Francisco-Oakland Bay Bridge New East Span Skyway



Development of Cost Estimates

The Program has had engineering design, cost, and schedules developed in consultation with respected outside experts. A myriad of variables inherently impacted cost estimates over time as illustrated by the following:

The 1997 SB60 estimate:

- Initial estimates were developed using preliminary design concepts within months of the decision to replace East Span. Normal estimating processes take 12 to 24 months and require detailed design studies.
- Final budget and contingencies were negotiated between the Department, the Business, Transportation, and Housing Agency (Agency) and Legislature based on financial plan options.
- East Span estimates were based on a skyway alternative with a short cable suspension bridge, not the far more intricate design ultimately chosen.

The 2001 AB1171 estimate:

- Estimates were developed in conjunction with private engineering firms, Federal Highway Administration (FHWA) and US Army Corps of Engineers.
- The estimate was reviewed and concurred by BATA (BATA) and Bechtel Infrastructure Corporation (Bechtel).
- The estimate included recommendations from Value Analysis Studies by TVI International, TY Lin International, and Moffatt Nichol.

The current August 2004 estimate:

- Estimates were updated in conjunction with private engineering firms, and BATA and Bechtel completed a review of costs, schedules, and contingencies.
- The estimate included recommendations from Value Analysis Studies by TVI International, Parsons Brinkerhoff, and by an independent review committee.

Key Estimating Challenges

- The toll bridges are the largest and most complicated structures in the world; nowhere in the world have bridges as complex been designed or built to today's high seismic standards.
- In updating both costs and schedule many risks have been identified. The 2.2-mile long East Span and the 4-mile long Richmond-San Rafael bridges are sufficiently unique that traditional public works estimating metrics do not apply.
- Contractors and transportation partners confirm that seismic construction strategies are being employed at scales never before used.
- Recognizing these significant challenges, the Department has utilized numerous outside peer groups, academia advisors, and consultants for design quality assurance and estimating project costs.
- The dynamic effects of the current economy on the construction financial, bonding, and insurance markets, escalation in materials and labor costs, fluctuations in the status of the steel fabrication and supply industry, and the uncertainty of international issues on key foreign supplies are difficult to evaluate and limit the ability to use statewide bridge cost history for estimating.
- Also, the development of staffing plans for projects of this scale includes numerous variables compared to typical project estimates.

In addition to the reviews included above, technical panels have included the Caltrans Seismic Advisory Board, the Seismic Peer Review Panel, the Wind Peer Review, and internal design peer review teams. Design work has been done by a combination of state staff and private consultants as shown in table below:

Bridge	Designer	% Construction Complete
Benicia Martinez (Interstate 680)	Imbsen & Associates	100%
Carquinez (Interstate 80)	Deleuw Cather	100%
Richmond San Rafael (Interstate 580)	Gerwick/Sverdrup/DMJM	85%
San Mateo Hayward (Route 92)	Department/Carter & Burgess	100%
Vincent Thomas (Route 47)	Moffatt & Nichol	100%
San Diego- Coronado	T Y Lin International	100%
West Span SFOBB — West Span - West Approach	Department Department	100% 25%
East Span SFOBB	TY Lin/Moffatt Nichol/ Parsons Brinckerhoff	25%

Cost Factors

Listed below are the primary factors contributing to increased costs in the program. More detailed information and explanation of these impacts are also included in the attached Appendix.

- September 11, 2001. The events of 9/11 occurred four days before AB1171 passed. This has led to significant changes in the financial, insurance and bonding markets.
- Materials and Labor Escalation. AB1171 contained typical 3 to 5 percent cost escalation factors. Given history of the Program, higher escalation and contingencies would have been prudent in the 2001 estimate process. Escalation factors based on Bay Area projects during the 2001 estimate development were at least 10 to 20 percent on large public works projects. Actual escalation over the last two years has exceeded 10 to 15 percent costs escalations, with some structural bridge materials at 100 percent.

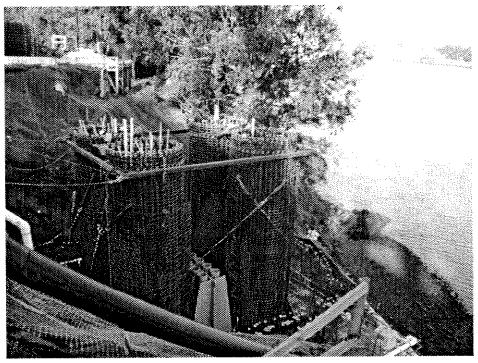
  In addition, the use of consultant experts and related cost rates to provide design services was underestimated for support during the construction phase to assist in resolving potential change orders and minimizing delay costs. The allowance for consultant rates in AB1171 was lower than actual Bay Area cost rates during the last three years.

- Industry Consolidation. Post 9/11 changes to insurance and bonding markets, coupled with the sheer magnitude of these projects, reduced available bidders and resulted in a limited number of joint ventures capable of bidding these projects. In addition, competition was limited due to the large number of simultaneous toll bridge contracts ongoing in the Bay Area, reducing the capacity of contractors to do additional projects or obtain additional marine equipment such as cranes, pile drivers, and barges.
- Time — AB1171 was based on a May 2007 East Span completion date. The current projected completion date is in 2011. Industry requested additional construction time based on final designs. The East Span was split into 16 contracts to improve bid-ability and competition. Extended time has resulted in additional cost escalation and increased support costs.

To summarize, the following have been incorporated into the current estimate:

- Bonding and insurance market changes.
- Steel price increases and steel industry consolidation.
- Unusual construction material escalation.
- Construction industry capacity limits competition.
- Complexity of marine work.
- Risk for construction delays.
- Recent issues during final design and contract development.
- Schedule adjustments that may impact capital and support costs.
- Replenishing a sufficient contingency balance.

Similar cost factors are also resulting in construction cost overruns on the new Benicia-Martinez northbound toll bridge foundation and superstructure contracts, a RM1 project.



San Francisco-Oakland Bay Bridge East Span
SAS Foundation on Yerba Buena Island (W2)

Cost Mitigation

Value analysis and quality assurance methods are an essential part of the aggressive project management effort that is in place to develop and manage costs for this Program. Specific mitigation steps taken to enhance biddable and buildable contracts include:

- The Self-Anchored Suspension Span Superstructure contract was split into smaller contracts to improve competition and increase the number of bidders.
- Contract enhancements have been incorporated for addressing the scale of work on the self-anchored suspension bridge to facilitate a biddable contract, including bid stipends, marine access mobilization, earlier mobilization payments, and an owner-contractor shop drawing review campus to reduce plan approval timelines.
- Organizational business practices were revised to provide an improved timeline for shop drawing approvals to increase quality communication and reduce contractor overhead during the fabrication and erection phases.
- The Department obtained approval to use Alternative C bidding on the SAS project, which allowed for the use of a foreign and domestic steel bid. This process had never been used prior to this project. It resulted in a $400M cost savings.

A number of enhancements were made to contracts to facilitate construction as follows:

- Payment method changes to address materials on hand, payment for preparing Shop drawings and marine construction.
- Multiple contractors outreach sessions to answer bidder inquiries.
- Pre-award shop audits of fabrication sites were performed.
- Fabrication tolerances were modified to be more flexible and encourage competition.
- Extensive review and improvement of welding specifications.
- Payment bonding requirements were reduced. Department supported AB1745 (Committee on Transportation, Chapter 186, Statutes of 2003) to improve bid competition by reducing bonding requirements from 100 percent of bid to 50 percent of bid for large projects.
- Land was acquired to provide space for contractor and Department to work closely together to resolve issues, expedite reviews and facilitate construction activities.

Reliability of Current Cost Estimates

To ensure that the costs being reported to the Legislature are reliable the Department has done the following to provide the most accurate information possible:

- Independent review and concurrence by Bechtel and BATA.
- Included anticipated costs for risks, change orders and claims. Risks are better known because design and construction are farther along.
- Incorporated lessons learned from completed bridges and contracts under construction.
- Significant progress made since AB1171, program risks are better defined:
  Five out of seven toll bridges completed.
  East Span Skyway contract is 55 percent complete with foundation risks clear.
  East Span bids opened on last large contract, the SAS, so bid risks are known.
  Richmond San Rafael Bridge retrofit is 85 percent complete.
  Three remaining East Span contracts are more conventional bridge construction.

Bechtel / MTC / Department Cost Comparison (Dollars in millions)

	AB1171	Aug 2004	Difference
SFOBB East Span			
- Skyway	$ 926	$ 1,490	$ 564
- SAS Superstructure	$ 682	$ 1,884	$ 1,202
- SAS Foundations	$ 148	$ 294	$ 146
- Other SFOBB East Span	$ 844	$ 1,462	$ 618
SFOBB East Span Subtotal	**$ 2,600**	**$ 5,130**	**$ 2,530**
Richmond San Rafael	$ 665	$ 914	$ 249
SFOBB West Span & Approach	$ 700	$ 737	$ 37
Other Toll Bridges (Retrofit Complete)	$ 672	$ 624	$ -48
Program Contingency	$ 448	$ 900	$ 452
TBSRP Total	**$ 5,085**	**$ 8,305**	**$ 3,220**

Self Anchored Suspension (SAS) Bridge

By law, the signature span was selected by the Metropolitan Transportation Commission (MTC) based on extensive public outreach campaigns. The MTC Engineering and Design Advisory Panel (EDAP) guided the selection process for the Bay Bridge Design Task Force (BBDTF). Listed below are the three main span designs and 1998 capital costs (a portion of the $1.4 billion to $1.5 billion total East Span estimate) associated with them that were considered:

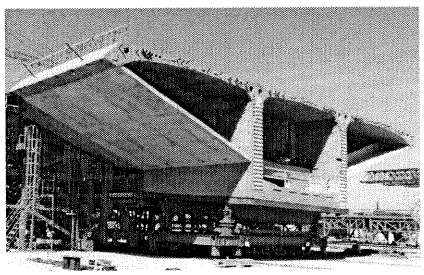
- Skyway Bridge Type Alternative $150 M
- Cable Stay Suspension Bridge Alternatives $230 M
- Self Anchored Suspension (SAS) Bridge Alternative $290 M

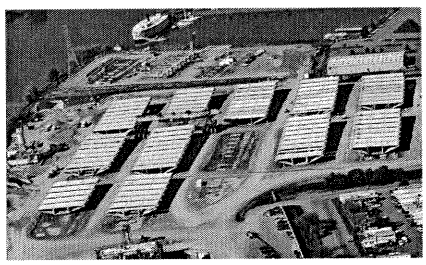
Based on these suspension bridge alternatives and with skyway planned for remainder of bridge, the overall East Span costs varied from $1.4 billion to $1.5 billion. The MTC Board selected the SAS alternative on June 24, 1998, by an eleven to one vote.

The SAS design was incorporated into AB1171:

The main span of the bridge shall be in the form of a single tower 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 to the FHWA. Section 188.5 (b) (9) (B).

Of the current cost increases on the East Span, 53 percent or $1.348 billion (excluding program contingencies) is attributable to the SAS.





San Francisco-Oakland Bay Bridge East Span
Skyway 3-story high pre-cast concrete segments in Stockton yard.

Schedule Information

The status of the toll bridges is outlined below:

Bridge	Retrofit Completion Date
San Mateo Hayward (Route 92) West Side	Completed April 2000
Vincent Thomas (Route 47)	Completed May 2000
Carquinez (Interstate 80)	Completed January 2002
San Diego-Coronado (Route 75)	Completed June 2002
Benicia Martinez (Interstate 680)	Completed July 2002
SFOBB East Span (Interstate 80)	Interim Retrofit Completed June 2000. Skyway is currently 55% Complete. Open to traffic by early 2011. Demolition of existing by 2013.
SFOBB West Span	Main Span Completed June 2004 Early 2009 — West Approach
Richmond San Rafael (Interstate 580)	Late 2005 — Currently 80% Complete

Note: The new Carquinez Westbound Bridge and Benicia Martinez Northbound Bridge are constructed under RM1.

Progress

Seismic retrofit work has been completed on five of the seven bridges. The seismic safety projects for the Vincent Thomas and San Mateo-Hayward bridges were completed in 2000. The seismic retrofit of the eastbound Carquinez Bridge was completed in 2001, while the seismic retrofit projects of the Benicia-Martinez and San Diego-Coronado bridges were completed in 2002. Construction contracts have been awarded on all seven bridges.

To date the construction portion of 20 contracts has been completed:

- San Francisco-Oakland Bay Bridge West Span: Retrofit of Main Spans; Retrofit of Upper Westbound Approach — Bents 54-57; Retrofit of Westbound Caissons — Piers W2-W6; Retrofit of Westbound Anchorages; Retrofit of Yerba Buena Island (YBI) Approach ; Retrofit of Yerba Buena Tunnel
- Benicia-Martinez Bridge: Retrofit of Approaches; Retrofit of Main Span
- San Mateo-Hayward Bridge: Retrofit of Existing Trestle; Retrofit of West Approaches and Pier 1; Retrofit of the High Rise
- San Diego-Coronado Bridge: Retrofit of Main Structure; Retrofit of Towers and Foundations — Piers 2-23; Retrofit of Towers and Foundations — Piers 24-32; Retrofit of East Approach Ramps
- Vincent Thomas Bridge: Retrofit of Main Span and Approaches
- San Francisco-Oakland Bay Bridge East Span: Retrofit of Eastbound Approach — Piers E23-E39; Interim East Bay Retrofit; Pile Installation Demonstration; Geofill

The seismic retrofit of the Interstate 580 Richmond-San Rafael Bridge is 85 percent complete.

The seismic retrofit of the Interstate 80 SFOBB West Span suspension bridges is 100 percent complete, while the West Approach structure replacement is 25 percent complete.

The seismic retrofit replacement of the Interstate 80 SFOBB East Span Skyway bridge portion is 55 percent complete, and the SAS (a single tower self-anchored cable suspension bridge) opened bids on May 26, 2004.

Project Information

BENICIA-MARTINEZ EXISTING BRIDGE SEISMIC RETROFIT

Background: This project is a seismic retrofit of the existing bridge, which was constructed in 1962. This existing Benicia-Martinez Bridge carries Route 680 traffic over the Carquinez Strait between the cities of Benicia in Solano County and Martinez in Contra Costa County. Currently, over 90,000 vehicles cross the bridge each day. When completed in 1962, the bridge was constructed with an initial four-lane width of 67 feet.

In 1991, the bridge was widened to its present width of 77 feet to accommodate six lanes of traffic.

This seismic retrofit project is separate from the BATA RM1 new toll bridge project currently under construction, which is not part of this seismic retrofit program.

Schedule/Cost: The seismic retrofit of the existing Benicia-Martinez Bridge was completed in July 2002. The current total project cost estimate is $180 million. The AB1171 cost estimate was $190 million.

CARQUINEZ BRIDGE SEISMIC RETROFIT

Background: The two Carquinez bridges carry approximately 109,000 vehicles per day on Interstate 80 across the Carquinez Strait between Contra Costa and Solano counties. The 1927 bridge carried westbound traffic and was replaced using RM1 toll funds. The eastbound Carquinez Bridge was built in 1958 as part of the route s upgrade to Interstate status; it will be retrofit while the 1927 bridge carries eastbound detour traffic. The 1927 bridge will be demolished thereafter.

Schedule/Cost: The seismic retrofit of the eastbound Carquinez Bridge was completed in January 2002. The current total project cost estimate is $115 million. The AB1171 cost estimate was $125 million.

RICHMOND-SAN RAFAEL BRIDGE SEISMIC RETROFIT

Background: Completed in 1956, the Richmond-San Rafael Bridge is part of Interstate 580, spanning between the City of Richmond in Contra Costa County and Point San Quentin in Marin County. The 4.5-mile long bridge, due to the structural inadequacies in its various portions, is vulnerable to a major earthquake.

Schedule/Cost: This project was awarded in October 2000, and construction will be complete in late 2005. The total project cost estimate is $914 million. The AB1171 cost estimate was $665 million.

SAN MATEO-HAYWARD BRIDGE SEISMIC RETROFIT

Background: The San Mateo-Hayward Bridge orthotropic steel spans were built in 1967. The bridge carries a total of 77,000 vehicles per day. The high-rise portion of this bridge consists of three lanes in each direction with no shoulders. The existing trestle or flat portion of the bridge consists of two lanes in each direction with no shoulders. The total bridge length is approximately 7.1 miles. The high-rise portion is 1.85 miles long, while the trestle is 5.15 miles long.

Schedule/Cost: The seismic retrofit work was completed in April 2000. The project accounting indicates a final cost of $165 million. The AB1171 cost estimate was $190 million.

VINCENT THOMAS SEISMIC RETROFIT

Background: The Vincent Thomas Bridge is a cable-suspension bridge built in 1963. The bridge is located on Route 47 and has four traffic lanes occupied with 39,000 vehicles daily. The bridge is 6,062 feet long and consists of a main suspended span (1,500 feet by 59 feet wide), two side spans (approximately 507 feet long each), and east and west side approaches. The east and west approaches include ten spans of structural steel plate girders supported on concrete bents and are approximately 1,706 feet and 1,842 feet long, respectively.

Schedule/Cost: The seismic retrofit of the Vincent Thomas Bridge was completed in May 2000. The final project cost is $59 million. The AB1171 cost estimate was $62 million.

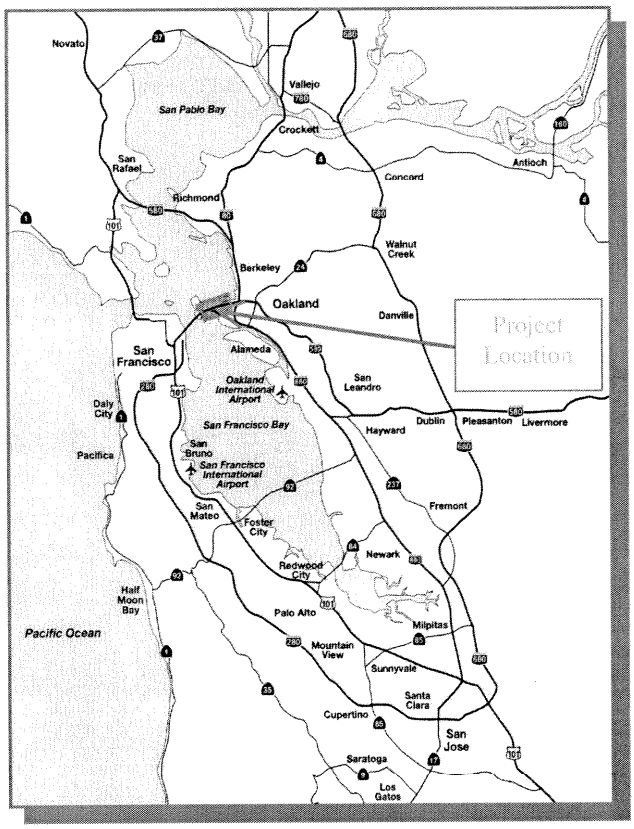
SAN DIEGO-CORONADO BRIDGE SEISMIC RETROFIT

Background: The San Diego-Coronado Bridge was opened to traffic in August 1969. The bridge is 2.12 miles long and consists of five lanes, with the center lane reserved as a safety median.

Schedule/Cost: The retrofit work was completed in June 2002. The final cost estimate was $105 million.

SAN FRANCISCO-OAKLAND BAY BRIDGE

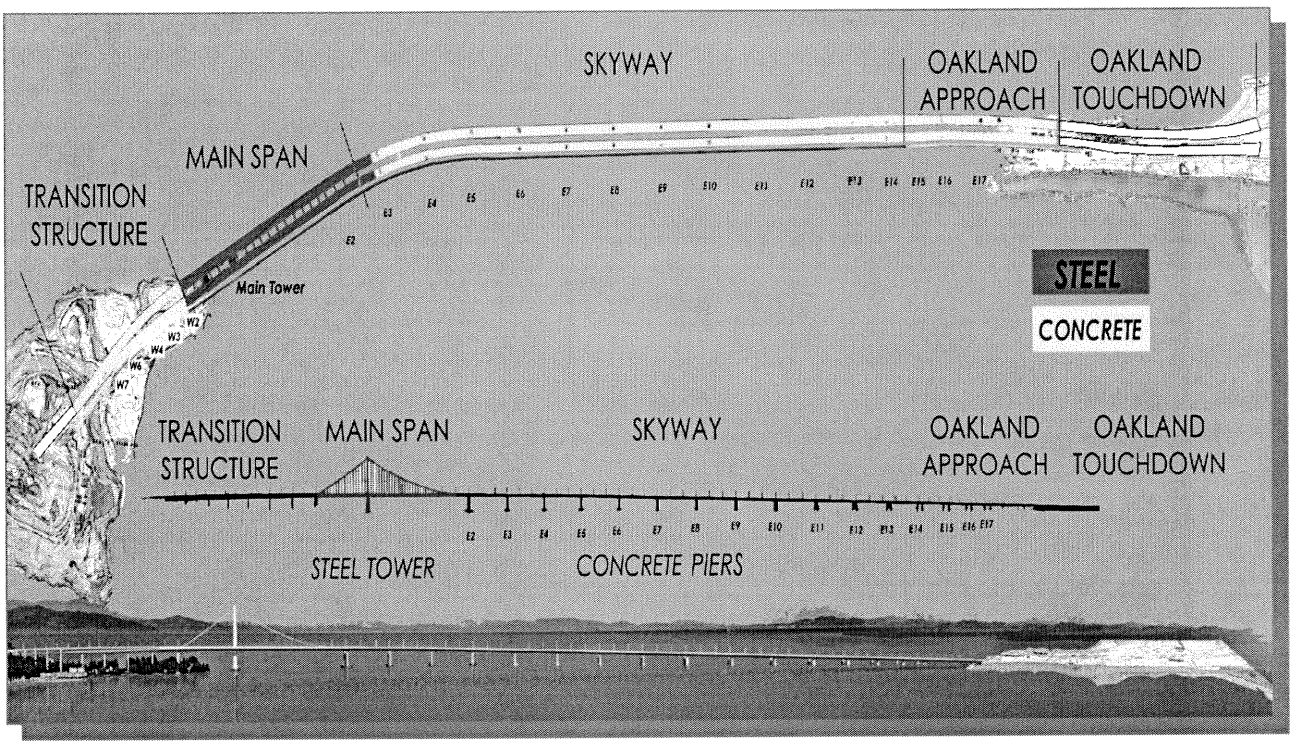
The San Francisco-Oakland Bay Bridge is part of Interstate 80, spanning the San Francisco Bay, with a total length of approximately 27,912 feet. The west span of the Bay Bridge is approximately 12,478 feet long and extends from the San Francisco anchorage to Yerba Buena Island. The east span is 15,434 feet in length and extends from Yerba Buena Island to Oakland. The existing bridge is over 60 years old. Each deck of the bridge consists of five traffic lanes in each direction with no shoulders. The west approach is approximately one mile long and extends from the San Francisco Anchorage, west, to Fifth Street. The Bay Bridge carries approximately 280,000 vehicles per day. The east span and west approach will be replaced, and the west span has been retrofit.



Project Location of the San Francisco-Oakland Bay Bridge East Span Seismic Safety Project

San Francisco-Oakland Bay Bridge — East Span Replacement

A new bridge will replace the existing east span of the Bay Bridge across the Central San Francisco Bay between Yerba Buena Island and the Oakland Mole. The new bridge will be built on an alignment to the north of the existing bridge. The new bridge will be approximately 11,526 feet long and approximately 230 feet wide, including the space between the eastbound and westbound bridge decks. It will provide five mixed-flow traffic lanes that will each be 12 feet wide and two shoulders that will each be 10 feet wide in each direction of travel. On the south side of the eastbound deck, a 15,434 feet foot bicycle/pedestrian path will be constructed one foot above the roadway and be separated from traffic by the roadway shoulder, a concrete barrier, and a railing. The bicycle/pedestrian path will extend from the Oakland Mole to the western terminus of the bridge at YBI.



San Francisco-Oakland Bay Bridge East Span — Graphic Showing Major Sections

The new east span will be constructed in four major sections: 1) Yerba Buena Island Transition, 2) the SAS steel self-anchored cable suspension span; 3) a pre-cast segmental concrete Skyway and 4) Oakland Approach/Touchdown. A demolition contract will be utilized to remove the existing bridge, following construction and the transfer of traffic onto the new east span.

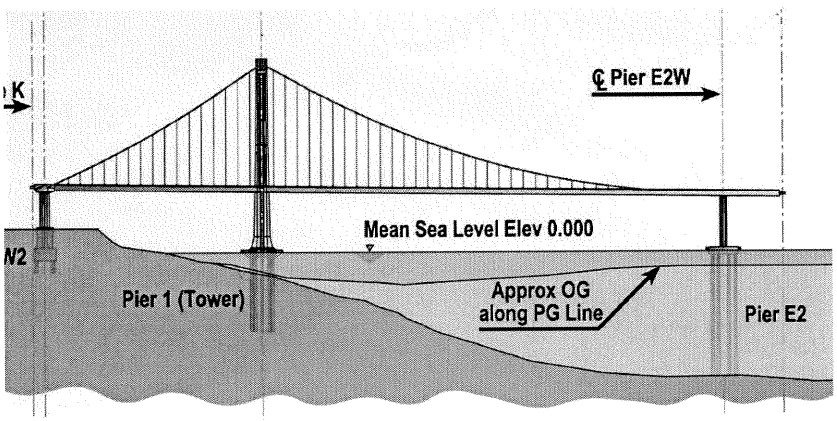
Yerba Buena Island Transition and Self-Anchored Suspension Span:

The construction of the YBI transition and SAS span was originally combined into one contract — the YBI and SAS contract. The contract limits of this section of the new bridge are in San Francisco and Alameda counties, in San Francisco and Oakland, from YBI to the east end of the SAS section.

To increase competition among contractors and provide more biddable contracts than the original YBI-SAS contract was divided into eight smaller contracts:

- Self-Anchored Suspension Bridge Land Foundation, West W2
- Self-Anchored Suspension Bridge Marine Foundations, East E2 and Tower T1
- Self-Anchored Suspension Bridge Superstructure; Box, Tower, and Cables
- YBI Electrical Substation and Retrofit of the Yerba Buena Island Viaduct
- YBI Transition Structures
- YBI USCG Road Relocation
- YBI South Side Detour
- YBI Building Demolition

The structures consist of a SAS superstructure, or main span, and the YBI transition structures from the YBI tunnel to the west end of the SAS.



San Francisco-Oakland Bay Bridge East Span Self-Anchored Suspension Bridge

The main span, located between Pier W2 on Yerba Buena Island (YBI) and Pier E2 over the main navigation opening, will be a steel orthotropic box, self-anchored suspension (SAS) bridge design. On YBI, the bridge will begin with transition structures that will move from the double-decked structure into two parallel structures. The structures will be prestressed, concrete box-girders.

Skyway:

San Francisco-Oakland Bay Bridge East Span Skyway Bridge

The contract limits for the Skyway section are located in San Francisco and Alameda counties (City of Oakland), between the limits of the Self-Anchored Suspension (SAS) span and the Oakland Approach/Touchdown. The two parallel Skyway superstructures consist of 13 spans of precast segmental concrete box girder and one span of orthotropic steel box girder. Panels are pre-cast at a yard in Stockton and shipped to the project site.

The substructure consists of reinforced concrete piers supported on steel frame footings filled with concrete, which are supported by cast-in-steel-shell concrete piles.

Oakland Approach/Touchdown:

The contract limits for this section are located in Alameda County on Route 80, from 5,254 feet west of the Bay Bridge toll plaza to 1,740 feet west of the toll plaza. This section connects the Skyway to the Oakland Mole. Two construction contracts will be used to complete the Oakland Approach/Touchdown. The first is a geotechnical contract, and the second is the contract to construct the Oakland approach structure.

The first contract prepared the embankment for the westbound roadway at the Oakland Touchdown (where the Oakland approach reaches land). The new westbound roadway is located just north of the current alignment.

The second contract will begin construction in late 2006 of the Oakland approach structure. The Oakland approach structure includes a cast-in-place, pre-stressed concrete box-girder supported by a cast-in-place, reinforced, concrete substructure. This section of the new bridge consists of two parallel structures, extending from the east end of the Skyway section to the Oakland Mole. The new roadway section will conform to the existing traffic lanes, approximately 1,642 feet west of the Toll Plaza.

Demolition:

The existing Yerba Buena Island (YBI) viaduct, the YBI steel truss approach spans, the Oakland approach structures, and the YBI temporary detours will be dismantled during

construction of the replacement bridge because of construction staging. The remaining sections will be dismantled under a separate contract after traffic is on the new bridge.

East Span Schedule

The AB1171 schedule to complete the East Span by May 2007 was unrealistic based on stage construction timelines required as reported by potential bidders and suppliers during contract advertisement. The westbound direction of the new facility is scheduled to open to traffic in early 2010, the east bound by late 2010, with bridge completion in 2011. Recent factors updated these dates:

- Contractor feedback during bidding process regarding material supply and scale of project based on input from subcontractors putting together a final bid package.
- Steel industry capacity and economic analysis studies in 2002/2003 provided an update of fabrication and erection timelines required for the SAS tower and decks.
- Corridor analysis of adjacent East Span contracts resulted in updated schedules to complete stages due to contractors work area and the timing of controlling activities.

East Span Cost Estimate

The current cost estimate for the new east span is $ 5.13 billion; the AB1171 cost estimate was $2.6 billion. Cost risks are associated with this estimate as identified above. This cost estimate for the new east span includes all costs incurred to date. The estimate includes: escalation, cost of engineering, environmental document, numerous extra studies, design costs, right-of-way, utilities, environmental mitigation, interim retrofit, cost of original retrofit design (sunk costs), actual and anticipated construction bids, potential for delay costs during change order resolution, and appropriate contingencies to address potential construction issues considered to date. See Appendix A for additional explanation.

In order to stay within program budget after the Skyway contract award, project, program contingencies and anticipated cost reductions were redistributed to fund the $312 million. Since then, as more Yerba Buena Island (YBI) transition and Self-Anchored Suspension (SAS) span contracts were delivered for advertising, updated cost estimates were increasing based on current market information and final design.

Estimating cost and schedule on this project has presented an unprecedented level of complexity with a unique set of challenges. It is difficult to ascertain how the marketplace will evaluate a project of this scale, resulting in potentially less competition among bidders and a high bid amount. The current estimate, developed in collaboration with Bechtel and BATA, incorporates the bidding history, current market escalation factors, the potential for delayed completion and related delay costs, and toll bridge contract lessons learned on potential change orders and claims.

San Francisco-Oakland Bay Bridge — West Span and Approach

Description: The seismic work on the west span includes retrofitting the west span and replacing the West Approach. The west span consists of twin, end-to-end suspension bridges and a three span continuous truss structure at the San Francisco end of the bridge. From this structure, the West Approach, a double-deck concrete structure on land, extends west to approximately 5th Street. The project focuses on the four major structural elements of the west span: the foundations in the Bay, the anchorages (including other supports on land in San Francisco), the towers and the superstructure. Throughout the west span, devices such as isolators and dampers are being installed to transfer seismic forces and restrict movement, and many rivets are being replaced with high-strength bolts. The West Approach will be completely replaced by steel reinforced concrete structures.

Schedule/Cost: The retrofit work on the west span will be complete in spring 2004; the West Approach replacement is scheduled to be complete in summer 2009. The current cost estimate to retrofit the west span is $305 million the current project cost estimate for the West Approach is $432 million. The AB1171 cost estimate was $700 million for the combined West Span and Approach.

Non-Toll Seismic Retrofit Program

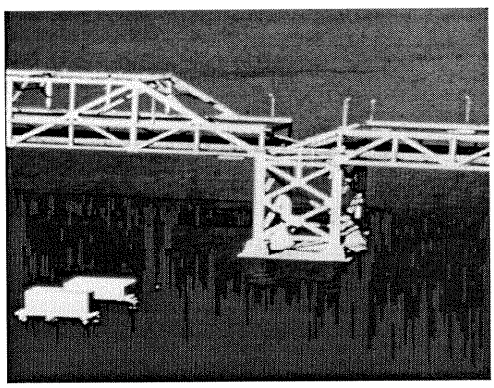
Phase 1 Seismic Safety Retrofit Program is 100 percent complete. A total of 1,039 bridges were retrofitted at a cost of $1.082 billion. This was a statewide program beginning in 1989 and funded from the State Highway Operations and Protection Plan (SHOPP). Retrofit bond failures prior to 1996 led to a decision to fund from SHOPP. 55 percent of the funds and 38 percent of the bridges were for bridges in the Bay Area.

Phase 2 Seismic Safety Retrofit Program is 98 percent complete. A total of 1,155 bridges are to be retrofitted at a cost of $1.350 billion. This was a statewide program beginning in 1994 and funded from the Proposition 192 Seismic Retrofit Bond approved by voters in 1996. 39 percent of the funds and 13 percent of the bridges were for bridges in the Bay Area.

Northridge and Loma Prieta seismic events: re-openings and repairs resulting from earthquakes had a majority of funding through Federal Emergency Restoration funds.

Background Summary

On October 17, 1989, the Loma Prieta Earthquake (Magnitude 7.1) struck the San Francisco Bay Area, resulting in 62 deaths and leaving 8,000 people homeless. The epicenter of the Loma Prieta Earthquake was approximately 60 miles away from the San Francisco-Oakland Bay Bridge (SFOBB).



Loma Prieta Bay Bridge Damage

The damage caused by this moderate Santa Cruz earthquake highlighted the seismic vulnerabilities of all the State-owned toll bridges, especially the SFOBB.

The California Department of Transportation (Department) initiated research projects soon after the Loma Prieta Earthquake to better understand the vulnerabilities of the State-owned toll bridges because of their structural complexity and uniqueness.

In response to the Governor s Executive Order D-86-90 (June 2, 1990), the Seismic Advisory Board (SAB) was formed consisting of preeminent experts in seismology, geotechnical engineering, and structural engineering from the earthquake community and academia. The advice from this board of experts and other peer review panels continues to be to proceed as quickly as possible since we are *Competing Against Time*[1].

The Seismic Advisory Board advises the Department on seismic safety policies, standards, and technical practices. The toll bridges are the largest and most complicated bridges in the State. Nowhere in the world have bridges as complex as these been seismically retrofit. Variable soil types and foundations, seismic forces ten times the original design forces, aged structures, heavy traffic volumes, conflicts with utilities, air space concerns, handling of hazardous waste, and care to protect sensitive aquatic, cultural, and historical resources all contribute to the difficulty in retrofitting these structures. Based upon the hazard and vulnerability studies and the Seismic Advisory Board s input, the Department determined that the following seven of the nine State-owned toll bridges would undergo seismic retrofit:

Bay Area Toll Bridges:
- San Francisco-Oakland Bay Bridge (West Span)
- Benicia-Martinez Bridge
- Carquinez Bridge (Eastbound)
- Richmond-San Rafael Bridge
- San Mateo-Hayward Bridge

Southern California Toll Bridges:
- Vincent Thomas Bridge
- San Diego-Coronado Bridge

In addition to retrofitting the above existing structures, replacement was deemed to be the most cost-effective, long-term retrofit strategy for two bridges:

- The San Francisco-Oakland Bay Bridge East Span
- The Westbound Carquinez Bridge [funded by the BATA using RM1 toll funds] (Streets and Highways Code Section 30913)

The Department has moved forward with an aggressive program to ensure that all bridges in California are seismically retrofitted, including the State-owned toll bridges. Past reviews of historic bridge performance during large California earthquakes indicate bridges designed after 1971 have performed well and better then pre-1971 bridge designs. This is documented in numerous resources. Researchers at the University of California Davis and the Department have reviewed selected bridges and have submitted a proposal to study quantitatively the remaining two Bay Arca toll bridges, the Dumbarton Bridge

[1] *Competing Against Time*, Report to Governor George Deukmejian from the Governor s Board of Inquiry on the 1989 Loma Prieta Earthquake, May 31, 1990

across the San Francisco Bay and the Antioch Bridge connecting Antioch and Sherman Island. Some evidence identified suggests a need to investigate and consider retrofit measures on post-1971 bridges. A project initiation document is being prepared in cooperation with the BATA to identify scope, cost, and schedule of potential project alternatives by Fall 2004. This research is an example to the continued commitment to seismic safety of which awareness of risk is fundamental.

Program Funding

Seismic Retrofit Program Budget

In August 2001, the Department reported a revised cost estimate for the Program. The State Legislature subsequently passed AB1171 which provided a funding plan to address the increased program costs. AB1171 increased the authorized funding for the Program to $4.637 billion and authorized a program contingency of $448 million (for a total of $5.085 billion). Of the total amount authorized under AB1171, 45 percent of the cost is toll and 55 percent is State/Federal funded. AB1171 authorized the use of State general obligation bond proceeds, State highway funds, federal bridge funds and the proceeds of a $1 surcharge (the seismic surcharge) imposed on all toll-paying vehicular traffic using the Bay Area Bridges. AB1171 also authorized the issuance of bonds securitized by the seismic surcharge. The seismic surcharge, which was originally scheduled to expire in 2008, was extended in AB1171 through December 31, 2037, to bring in a total expected revenue of $4.72 billion, of which only $2.282 billion plus debt service (or roughly 48 percent of the total seismic surcharge revenue) may be used to fund the program.

Funding Sources

Funding for the Program projects was established under AB1171 and capped at $5.085 billion. AB1171 also set forth funding sources and levels, and directs these funds to pay construction and related costs of the Program projects. The funding sources specified in AB1171 include seismic surcharge revenues (and interest earnings thereon), the principal amount of bonds and other obligations payable from seismic surcharge revenues (and interest earnings thereon), proceeds of obligations issued under the Seismic Retrofit Bond Act of 1996, the State Highway Account, the Public Transportation Account, the San Diego-Coronado Toll Bridge Revenue Fund, the Vincent Thomas Toll Bridge Revenue Account and the State of California s share of the federal Highway Bridge Replacement and Rehabilitation Program.

AB1171 allocates $4.637 billion of funding from these various fund sources to pay for construction of the Program projects. If the Program costs exceed this amount, AB1171 authorizes the Department to program a maximum of $448 million of additional funds from project savings or other available sources from the Interregional Transportation Improvement Program, the State Highway Operation Protection Program (SHOPP), or federal bridge funds to pay additional Program costs. The Department has accounted for this expenditure in the 2004 Fund Estimate that was adopted by the California Transportation Commission on December 10, 2003. The funding source for this contingency amount is the State Highway Account (SHA) and is identified as SHOPP expenditure in the 2004 Fund Estimate.

The following table outlines the amounts made available for the Program under AB1171 from each funding source.

SEISMIC RETROFIT PROGRAM FUNDING SOURCES
($ in millions)

Funding Source	Amount Allocated Under AB1171
Seismic Surcharge Revenues	$ 2,282
Seismic Retrofit Bond Act of 1996	790
State Highway Account	795
Public Transportation Account	80
San Diego-Coronado Toll Bridge Revenue Fund	33
Vincent Thomas Toll Bridge Revenue Account	15
Highway Bridge Replacement and Rehabilitation Fund	642
Total	$ 4,637
Contingency[(2)]	$ 448
Total Including Contingency	$ 5,085

[(2)] If Seismic Retrofit Program project costs exceed $4.637 billion, AB1171 allows the Department to program not more than $448 million from Program project savings or other available sources from the Interregional Transportation Improvement Program, State Highway Operation Protection Program or federal bridge funds for that purpose. See — Contingency Funds below.

Seismic Surcharge Revenues. Pursuant to AB1171, seismic surcharge revenues, the principal amount of bonds and other obligations payable from seismic surcharge revenues and interest earnings thereon are available to pay Program project costs only to the extent the sum of seismic surcharge revenues received by the Department and the investment earnings thereon the Department has received, plus all amounts previously deposited into the Construction Fund from bond proceeds and the investment earnings thereon does not exceed a maximum of $2.282 billion.

Seismic Retrofit Bond Act of 1996. The Seismic Retrofit Bond Act of 1996 (the 1996 Bond Act) authorizes $2 billion for the reconstruction, replacement, or retrofitting of state-owned highways and bridges. AB1171 allocated to the Program $790 million from the proceeds of bonds issued under the 1996 Bond Act.

State Highway Account. The State Highway Account is the main funding source for the programs administered by the California Transportation Commission (CTC). The principal sources of funds for the State Highway Account are excise taxes on motor vehicle fuels, truck weight fees, and Federal Highway Trust Funds. Approximately $445 million has been transferred[1] from the State Highway Account to the Program. Approximately $350 million of the AB1171 State Highway Account allocation remains to be transferred. The Department anticipates receipt of such balance in fiscal years 2005-06 and 2006-07. Transfers in future fiscal years are subject to appropriation by the State Legislature.

[1] As of December 2003

Public Transportation Account. Funds in the Public Transportation Account (the PTA) are available for transportation planning and mass transportation purposes as specified by the State Legislature. Approximately $10 million from the PTA has been transferred[1] to the Program, with the balance of $70 million allocated under AB1171 planned for disbursement in fiscal year 2005-06 and fiscal year 2006-07. These future transfers are subject to appropriation by the State Legislature.

San Diego-Coronado Toll Bridge Revenue Fund. The full $33 million allocated under AB1171 has been transferred from the San Diego-Coronado Toll Bridge Revenue Fund to the Program.

Vincent Thomas Toll Bridge Revenue Account. The Vincent Thomas Toll Bridge Revenue Account (the VTTBRA) does not have sufficient funds to transfer the full $15 million allocated under AB1171 to the Program. The Vincent Thomas Bridge, from which the VTTBRA derived its revenues, is no longer a toll bridge, and there is no revenue stream to the VTTBRA other than interest earnings. The Department plans to transfer the current cash balance of the VTTBRA cash balance of approximately $6.6 million to the Program and allow such funds to accrue interest in the Seismic Retrofit Account. The Department plans to utilize additional contingency funds or available borrowed funds to the extent of any shortfall in actual VTTBRA funds.

Bay Area Toll Bridges Seismic Retrofit Revenue Bonds, Series 2003A. In August 2003, the toll revenue backed bonds of $1,160,435,000 were issued by the California Infrastructure and Economic Development Bank (Infrastructure Bank) pursuant to the State-Owned Toll Bridge Seismic Retrofit Financing Act of 2001, (commencing with section 31070 of the Streets and Highways Code). The Infrastructure Bank will lend the net proceeds of the 2003A First Lien Bonds to the California Department of Transportation (the Department), pursuant to a Financing Agreement, to finance a portion of the seismic retrofitting of five of the seven toll bridges. A supplemental bond issuance is planned to occur in 2005.

Transportation Infrastructure Finance and Innovation Act of 1998 (TIFIA). The Program is also eligible for assistance under the federal TIFIA program. The Department has obtained a commitment for up to $450 million of financing from the United States Department of Transportation (USDOT). Should the Department enter into a TIFIA loan agreement with the USDOT, such loans would be payable from seismic surcharge revenues on a subordinate basis to the 2003A First Lien Bonds.

Existing Toll Structure

Currently there is a $3 dollar toll (varies for > 2 axles) assessed on Bay Area toll bridges. The toll is administered as follows:

- $1 Base Toll of RM1, administered by BATA.
- $1 seismic surcharge administered by the Department.
- $1 additional Base Toll of Regional Measure 2, administered by BATA.

Of the seismic surcharge, $2.282 billion is committed to the Toll Bridge Program. An additional amount (not specified) is committed to bond debt service for the Toll Bridge

Program. The balance of funds is available to MTC. MTC plans to use $460 million for specific regional projects (See Appendix for list of projects).

Surcharge Revenues and Expenditures

By law, the use of revenues from the seismic surcharge is restricted to the payment of the costs of the Program, including the payment of principal and interest on bonds (including the 2003A First Lien Bonds) issued to finance such costs. AB1171 also allocates, without specified limit, the funds necessary to meet all costs of financing.

All seismic surcharge revenues are required to be deposited into the Toll Bridge Seismic Retrofit Account (the Toll Bridge Seismic Retrofit Account) established in the State Transportation Fund. The seismic surcharge is set at $1 per vehicle, is authorized to be imposed through December 31, 2037. The seismic surcharge may only be increased under existing statute to meet debt payment obligations (see following discussion under Seismic Surcharge Increases). Section 31010 of the Streets and Highways Code provides that the seismic surcharge may be discontinued prior to December 31, 2037, if the California Transportation Commission (the CTC) notifies the Secretary of State that sufficient funds have been generated to meet the obligations under and relating to bonds secured by seismic surcharge revenues.

The following table sets forth-seismic surcharge revenues for Fiscal Years 1997-1998 through 2002-2003 for the Bay Area Bridges.

SEISMIC SURCHARGE REVENUES
COLLECTED ON BAY AREA BRIDGES

Fiscal Year Ending June 30,	Seismic Surcharge Revenues
1998	$ 56,315,184
1999	117,829,724
2000	120,828,462
2001	122,215,821
2002	124,000,335
2003	124,170,551

Toll Bridge Authorities

Pursuant to California law, the Department is responsible for collecting tolls, operating and maintaining the Bay Area Bridges in good repair and condition, and designing and constructing improvements to the Bay Area Bridges. Maintenance, rehabilitation and reconstruction of the highway system, which includes the Bay Area Bridges, are accorded the highest statutory priority for budgeting and expenditure on work within the powers and duties of the Department.

The operation of the Bay Area Bridges is jointly administered by the BATA (BATA) and the Department. The Department is responsible for constructing, operating and maintaining the Bay Area Bridges, including the collection of all toll revenues. BATA is charged with the responsibility for programming, administering and allocating all toll revenues from the Bay Area Bridges, other than the seismic surcharge. Pursuant to a

cooperative agreement effective as of July 1, 2003, and as amended, BATA and the Department have allocated funding responsibilities for the operation and maintenance of the Bay Area Bridges.

BATA is also authorized to issue bonds to finance improvements to the Bay Area Bridges not encompassed by the Program. Net toll revenues secure these bonds, of which $700 million are currently outstanding, from the Bay Area Bridges, excluding the seismic surcharge revenues. Pursuant to State Senate Bill 45, enacted in 1988 and later approved by the Bay Area voters as RM1 (RM1), the current basic toll schedule became effective on January 1, 1989 providing a uniform basic toll of $1.00 for two-axle vehicles. The State has authority to raise toll rates on the Bay Area Bridges to ensure payment of its bonds.

Seismic Surcharge Increases

The seismic surcharge was set by statute at $1.00 per vehicle for passage on the Bay Area Bridges, except for vehicles that are permitted toll-free passage on the Bay Area Bridges. Under section 31010 of the Streets and Highways Code, the Department is authorized to increase the seismic surcharge for debt service purposes if the Infrastructure Bank finds, and the California Department of Finance confirms, that the following apply:

(1) Extraordinary circumstances exist that jeopardize the payment of debt service on bonds payable from seismic surcharge revenues, and all other financial resources for making such payments have been exhausted; and

(2) BATA Bonds will not be impaired solely as a result of such rate increase, as evidenced by confirmation of the then existing credit ratings on BATA Bonds, by the rating agencies then rating the BATA Bonds.

BATA Surcharge Increases

In addition to the seismic surcharge, vehicles using the Bay Area Bridges are charged a base toll (the Base Toll). Base Toll revenues are pledged exclusively to the payment of the BATA Bonds and are not available to pay the Seismic Revenue Bonds. Pursuant to statute and RM1, the current Base Toll schedule became effective on January 1, 1989.

The table below sets forth the toll rates currently in effect on the Bay Area Bridges. Tolls on the Bay Area Bridges are collected in only one direction.

BAY AREA BRIDGES TOLL RATES

Axles Per Vehicle	Base Toll[(1)~]	Seismic Surcharge	Total Toll
2axles	$1.00	$1.00	$2.00
3 axles	3.00	1.00	4.00
4 axles	5.25	1.00	6.25
5 axles	8.25	1.00	9.25
6 axles	9.00	1.00	10.00
7 axles or more	10.50	1.00	11.50

(1) Excluded from the seismic surcharge revenues.

Subject to certain limitations under State law, BATA determines the Base Toll. BATA has no authority to alter the seismic surcharge. BATA has statutory authority to set the Base Toll rate schedule as may be necessary to meet its bond obligations. Base Toll rate increases beyond the rates necessary to satisfy such bond obligations require the authorization of the State legislature.

Legislation SB916 was approved by State legislature and signed by the Governor in November 2003, requiring a special election March 2, 2004, in the Bay Area to approve an increase in the base toll of $1.00 per vehicle. The measure, known as Regional Measure 2 (RM2), was approved by a majority of voters in the special election, and the base toll increase was effective July 1, 2004. Revenues generated from the base toll increase will be administered by BATA and used to fund public transportation projects and projects determined to reduce congestion or improve travel options on the toll bridge corridors (see Appendix for list of projects). The increase in base toll will not provide funding to supplement the seismic surcharge. SB916 does not affect the imposition or collection of the seismic surcharge so long as revenue bonds are outstanding.

Additional Bonds and Obligations

Additional Bonds may be issued or incurred under the Indenture for the purposes of (i) financing the costs of the Program and (ii) refunding any TIFIA Loan or any Bond. However, under the Financing Agreement, Additional Bonds may not be issued by the Infrastructure Bank if, immediately after such issuance, the sum of (a) all seismic surcharge revenues received by the Department prior to September 1, 2003, (b) all Bond proceeds and seismic surcharge revenues previously deposited into the Construction Fund, (c) the amount that will be deposited into the Construction Fund from the proceeds of the Bonds then proposed to be issued, (d) the seismic surcharge revenues that the Department projects will be deposited into the Construction Fund through the Completion Report Submission Date and (e) the earnings that the Department has received and projects that it will receive through the Completion Report Submission Date from the investment of the amounts described in clauses (a) through (d), will exceed $2.282 billion, or such higher amount as the State Legislature may subsequently determine.

The ultimate principal amount of additional bond or other financing instruments to be issued by the Infrastructure Bank and the timing of such issuances are determined by the Infrastructure Bank and the Department based on the needs of the Program and resources available.

Prior to each issuance of bonds by the Infrastructure Bank, the Infrastructure Bank must confirm that the outstanding BATA bonds will not be impaired by the issuance of bonds by the Infrastructure Bank, as evidenced by confirmation of the then existing ratings on the BATA bonds by the rating agencies then rating the BATA Bonds.

The current TBSRA financial plan includes a proposal for additional bonds to be issued in 2005.

Summary

The Department continues to make significant progress in retrofitting the State s toll bridges within the funding AB1171 provided in 2001, but with funding needs remaining to address various cost factors. Risks include the continuing impacts of economic changes following the incidents of September 11, 2001, resulting in increased cost of large construction projects while competing with domestic market changes in steel, bonding, and insurance, including the extensive steel needs of the Metropolitan Transportation Commission s selected new east span suspension bridge.

- Since 2001, the competitive impact of five toll bridges being done in the Bay Area at once was a factor in limited and higher bidding on later East Span contracts.
- There is an inherent balance of the economic considerations and the best use of taxpayer transportation funds with the need to protect lives and facilitate fast recover of the Bay Area and State economy after a major seismic event.
- As of July 1, 2004, 49 percent of the program is currently under contract.
- As of July 1, 2004, the total completed projects and work under contract, including capital outlay support expenditures, is approximately $4.1 billion.
- The Department has moved forward in implementing the Bay Area s desires as communicated by Metropolitan Transportation Committee by awarding the new east span Skyway contract in 2002 and advertising in February 2003 the signature self-anchored suspension superstructure contract.
- Increased costs have been driven by several factors and complications, including: time delays related to selection of a signature bridge self-anchored suspension (SAS) span and the construction complexity of the SAS; insufficient initial analyses of costs; and external global cost escalation factors.
- A funding solution is needed to continue the Program and complete the needed seismic safety projects of the two remaining critical bridges in the Program (Richmond-San Rafael and San Francisco-Oakland Bay Bridges).

The Department is prepared to address any challenges that might arise as the Program proceeds and intends to pursue aggressive and innovative solutions in its commitment to successfully deliver the complete seismic safety program efficiently and effectively.

Appendix A **Detailed Cost Explanation**

Bonding and Insurance Market Changes: The marketplace is such that there are restrictions on the ability to get bids and on competition due to bond availability for large projects over $500 million. After a decade of considerable profitability, and magnified by significant losses attributed to some high profile bankruptcies in 2001, sureties are experiencing a firming of pricing and tightened underwriting requirements. In the September 11, 2001, terrorist attacks impacted property and casualty insurance companies that are surety s parent companies, causing erosion in capital. Although much of this capital has returned to the market, insurance companies have become especially careful how capita is used, which affects underwriting decisions. This has resulted in less surety competition for large projects. Now sureties no longer determine risk on historical loss experience, but assess their exposure by considering bond amount, duration, and likelihood of full bond forfeiture. This has resulted in higher costs and less flexibility for contractors. This has resulted in less bidders and higher bids on large projects.

Steel: The suspension bridge contract includes over 60,000 tons of structural steel. Steel prices have surged over 50 percent during the last year for a variety of reasons, from climbing raw material costs and strong global demand to a weaker U.S. dollar. The biggest problem currently facing the North American steel industry is the availability of coke, a converted form of coal used in traditional steel-making furnaces. U.S. steel makers have historically imported coke to counter any short-term deficiencies, but China long one of the world s most important exporters of coke now consumes its supply domestically due to a 25 percent increase in last year's production, leaving little coke for export, impacting the domestic market s capacity to bid large steel projects such as the East Span suspension bridge. Steel industry capacity and economic changes in 2002-2003 have resulted in fluctuations in supply and demand that have impacted both domestic and international markets for steel production and steel fabrication, particularly for large scale assembly and delivery.

Another contributing factor is the high price of scrap steel. Steel is the most recycled of all materials, with an entire class of newer steel companies depending on scrap as their primary input. Scrap prices are twice as high as they were at the same time in late 2002, also impacting the domestic market s capacity to bid large steel projects such as the East Span suspension bridge.

Consolidation of US steel producers has limited capacity and competition. In 2001 when hot rolled steel was selling for less than $250/ton, producers were selling so far below costs that many U.S. steel firms filed for bankruptcy and shut down.

Complexity of Marine Work: The Department has limited historical data for large marine based construction projects. Lessons have been learned from the five completed projects. Contract changes occurred due to weather, wind and currents impacted barge access, marine construction operations and working days. The extent and cost of customized marine equipment increased and specialized design support was needed to resolve technical issues. Federal requirements for work in US waters restricted marine construction to U.S. flagged vessels. Due to limited availability of large U.S. flagship

vehicles this required restaging of fabricated pieces and more welding and time. Permit requirements for mitigation added uncertainty to marine work. On the skyway contract the contractor elected to use more expensive cofferdam approach rather than the experimental bubble curtain approach to maintain production.

Industry Feedback: Large contracting firms are incorporating lessons learned during toll bridge construction during the last three years, and reflect their updated findings in the bids and in price information. In addition, throughout the February 2003 to May 2004 advertisement period for the east span suspension bridge contract, contractors provided feedback on their ability to obtain bonding and insurance, form financial joint ventures with other bidders, and their ability to construct a project of this large scale utilizing a limited equipment market for barges, cranes, and labor. It was made clear that the completion of East Span by the AB1171 May 2007 target was unrealistic once contract plans were reviewed these firms. Two outreach meetings were held and twenty-six contract addenda were produced in response to resolve bidder inquiries prior to bid opening.

Construction Industry Capacity: At the time of AB1171 it was anticipated that five bidders would compete for the major contracts. Two bids were received on the Skyway contract and one bid on the SAS. Post 9/11 economy, bonding, and insurance market change have limited bidding and competition. There were too many concurrent large bridge and highway contracts in the Bay Area, nearly $4 billion underway in 2003. Competing demands for heavy marine construction equipment nationwide and the Bay Area have limited availability. The resulting costs due to limited availability were not anticipated.

Field Lessons: Seismic design requirements present other cost risks in the ongoing construction contract for the Skyway concrete segmental bridge portion of the new East Span. The Skyway portion is 1.1 miles in length, extending from the Oakland east shore toward Yerba Buena Island, and will be made up of 452 pre-cast reinforced concrete post-tensioned segments. The project is 55 percent complete and 180 segments have been cast as of July 2004. The Skyway pre-cast bridge sections, the largest of this type ever cast, are stored in the Stockton pre-cast yard until needed and then shipped by barge to the job site and lifted by crane to their final position in Oakland. The first shipment by barge to the project site began in July 2004. Cost risks include the seismic redesign impacts during construction to accommodate field adjustments on the hinge segments and pier tables, both of which are required to be cast before shipment and lifting of the bridge sections can begin. Cost increase risks due to delay days include time-related overhead and equipment rates for potential delay at $350,000 to $500,000 a day over the next year.

In addition, the remaining construction contracts to complete the seismic retrofit work for Richmond-San Rafael bridge, which is 85 percent constructed and is planned for a 2005 completion, and the SFOBB west approach replacement will require additional contract contingency funds beyond the original 5 percent budget to address contract change orders and resolve potential claims.

Risks for Construction Delays: Support costs have increased due to costs associated with a detailed shop drawing process. Conflict must be fully resolved prior to work over

water. Time related overhead costs were originally estimated at 10 percent of the capital costs. Awarded contracts have varied between 15 and 25 percent.

Expert Costs: Other cost risks include extensive hours of specialty consultants, as engineer of record, and appropriate State engineering staff to timely support change orders and resolve complex seismic design issues that may arise during large-scale bridge construction. In addition, AB1171 did not anticipate engineering costs beyond 2007, and the current schedule requires support through 2012.

Schedule Delay Costs:

Schedule adjustments are impacting capital and support costs.

Topic	AB1171	2004	Change
SAS was 1 contract at AB1171. Contract was split into 8 contracts — advancing some work while delaying other portions.	1 large contract to advertise July 2002	SAS package complete Jan 2002	6 months
Splitting major contracts into 16 contracts required adjustments to stage construction and manage corridor activities. Time added for bids and advertisement.	Original completion August 2004	Updated for temporary May 2007	35 months
SAS bid date extended to prepare addenda for bidder s inquiries.	3 months planned	16 months	13 months
Steel specifications, shop drawing review time and steel market conditions for tower and deck fabrication were not fully evaluated.	Tower 17 months Deck 23 months	30 months 36 months	13 months
Complexity of tower and deck erection was not fully evaluated.	13 months	18 months	5 months
Complexity of cable system erection was not fully evaluated.	5 months	21 months	16 months
Skyway has encountered 80 days construction delays. Risk for additional delays.			3+ months

Final Design: As the self-anchored suspension superstructure design was finalized, particularly the unique steel tower and orthotropic box deck sections, contract item quantities and cost estimates were updated based on Bay Area and national trends for major bridge projects requiring special steel fabrication, pile installation permit restrictions, potential long distance shipping, and federal marine equipment restrictions.

The costs for specialized and customized welding procedures, which require automated welding, were not originally fully incorporated. Also, the cost of the engineering controls to minimize the effect of warping, uneven shrinkage, and chemical property changes cause by welding were not fully included.

Appendix B — MTC Resolution 3434 Project List

According to MTC, the projects included in Resolution 3434 which are programmed to receive funds from remaining seismic toll surcharge funds are:

PROJECTS	Res. 3434 AB1171 Funding Commitment
Transbay Terminal	$150 Million
eBART	$115 Million
tBART	$ 95 Million
80/680 Cordellia I/C	$100 Million
Total	**$460 Million**

Note: These same projects are also receiving separate funds from RM2. None of these projects are fully funded.

eBART is the proposed extension of rail transit service into eastern Contra Costa county using diesel multiple unit (DMU) trains.

tBART is a proposal for BART extension in north eastern Alameda County from Dublin/Pleasanton to Livermore using diesel multiple unit (DMU) trains.

RM 2 Capital Project List
July 14, 2004

Legislative Project No.	RM-2 Toll Funding (thousands)	Deliverable Segment No.	Deliverable Segment Project Title	Project Sponsor
1	$ 3,000	1	BART/SF MUNI Direct Connection at Embarcadero & Civic Center Stations	BART
2	$ 30,000	2	SF MUNI Metro 3rd Street LRT Extension	SF MUNI
3	$ 10,000	3	SF MUNI Historic Streetcar Expansion (E-Line)	SF MUNI
4	$ 135,000	4	Dumbarton Commuter Rail Service	San Mateo TA, Alameda CMA, ACTIA
5	$ 28,000	5	Vallejo Ferry Intermodal Station	City of Vallejo
6	$ 20,000	6.1	Solano County Express Bus Intermodal Facilities - Vallejo Curtola Transit Center	City of Vallejo
		6.2	Solano County Express Bus Intermodal Facilities - Benicia Intermodal Facility	City of Benicia
		6.3	Solano County Express Bus Intermodal Facilities - Fairfield Transporation Center	Fairfield/Suisun Transit
		6.4	Solano County Express Bus Intermodal Facilities - Vacaville Intermodal Station	City of Vacaville
7	$ 100,000	7	Solano I-80 / I-680 Corridor Improvements	STA
8	$ 50,000	8	I-80 EB HOV Lane Extension from Route 4 to Carquinez Bridge	Caltrans
9	$ 16,000	9	Richmond Parkway Park & Ride	AC Transit
10	$ 35,000	10.1	SMART Extension to Larkspur or San Quentin	SMART
		10.2	San Quentin Intermodal/Water Transit Terminal Study	SMART
11	$ 65,000	11.1	Sir Francis Drake Blvd Widening	Transportation Authority of Marin
		11.2	U.S. 101 Greenbrae I/C Corridor Imps. - Sir Francis Drake To Tamalpais	Transportation Authority of Marin
		11.3	Cal Park Hill Tunnel Rehabilitation and Bikeway	Transportation Authority of Marin
		11.4	Central Marin Ferry Access Imps. Phase A - Wornum to Corte Madera	Transportation Authority of Marin
		11.5	Central Marin Ferry Access Imps. Phase B - Corte Madera Ck. and Sir Francis Drake	Transportation Authority of Marin
12	$ 15,000	12.1	Direct HOV lane connector from I-680 to the Pleasant Hill BART	CCTA
		12.2	Direct HOV lane connector from I-680 to the Pleasant Hill BART - STUDY	CCTA
13	$ 90,000	13.1	E-BART / Rail Extension to East Contra Costa Deliverable Segment #1	BART, CCTA
		13.2	E-BART / Rail Extension to East Contra Costa Deliverable Segment #2	BART, CCTA
14	$ 25,000	14.1	Benicia / Bahia Siding Extension	Capital Corridor JPA
		14.2	Fairfield/Vacaville Intermodal Rail Station and Track Improvements	Fairfield/Suisun Transit
15	$ 25,000	15	Central Contra Costa BART Crossover	BART
16	$ 50,000	16	Benicia-Martinez Bridge: New Span	BATA
17	$ 20,000	17.1	Express Bus North - Vallejo Curtola Transit Center	City of Vallejo
		17.2	Express Bus North - Benicia Park/Industrial I/C Improvements and Park and Ride	City of Benicia
		17.3	Express Bus North - Fairfield Transporation Center	Fairfield/Suisun Transit
		17.4	Express Bus North - Vacaville Intermodal Station	City of Vacaville
		17.5	Express Bus North - Martinez Transit Center	CCCTA
		17.6	Express Bus North - Diablo Valley College Transist Center	CCCTA
		17.7	Express Bus North - Napa VINE	Napa VINE
		17.8	Express Bus North - GGBH&TD	GGBH&TD

RM 2 Capital Project List
July 14, 2004

Legislative Project No.	RM-2 Toll Funding (thousands)	Deliverable Segment No.	Deliverable Segment Project Title	Project Sponsor
18	$ 22,000	18	TransLink®	MTC
19	$ 20,000	19	Real-time transit information	MTC
20	$ 22,500	20.1	City CarShare	City Car Share
		20.2	Safe Routes to Transit	East Bay Bicycle Coalition, TALUC
21	$ 143,000	21	BART Tube Seismic Retrofit	BART
22	$ 150,000	22	Transbay Terminal/Downtown Caltrain Extension	Transbay JPA
23	$ 30,000	23	Oakland Airport Connector	BART, Port of Oakland
24	$ 65,000	24	AC Transit Enhanced Bus - Phase 1 (International Blvd/Telegraph Ave. Corridor)	AC Transit
25	$ 12,000	25	Commute Ferry Service for Alameda/Oakland/Harbor Bay	WTA
26	$ 12,000	26	Commute Ferry Service for Berkeley/Albany	WTA
27	$ 12,000	27	Commute Ferry Service for South San Francisco	WTA
28	$ 48,000	28.1	Water Transit Facility Improvements, Spare Vessels and Environmental Review	WTA
		28.2	Richmond Ferry Terminal Increased Ridership Study	WTA
29	$ 22,000	29.1	Express Bus South - I-880 NB / Maritime Street HOV On-Ramp	Alameda County CMA
		29.2	Express Bus South - SR 84 WB / Newark Blvd HOV ON-Ramp	Alameda County CMA
		29.3	Express Bus South - SR 84 WB HOV Lane Extension	Alameda County CMA
		29.4	Express Bus South - Hesperian Blvd park and Ride Lot	Alameda County CMA
		29.5	Express Bus South - Purchase of Rolling Stock	AC Transit
30	$ 10,000	30	I-880 North Safety Improvements	Alameda County CMA
31	$ 95,000	31.1	BART Warm Springs Extension	BART
		31.2	BART Warm Springs Extension - Grade Separation	City of Fremont
32	$ 65,000	32	I-580 (Tri Valley) Rapid Transit Corridor Improvements Deliverable Segment # 1	Alameda County CMA
33	$ 6,500	33.1	Regional Rail Master Plan	Caltrain, BART
		33.2	Transit Connectivity Plan	MTC
34	$ 1,500	34	Integrated Fare Structure Program	TransLink® Consortium
35	$ 5,000	35	Transit Commute Benefits Promotion	MTC
36	$ 50,500	36.1	Caldecott Tunnel Improvements - Deliverable Segment # 1	CCTA
		36.2	Caldecott Tunnel Improvements - Deliverable Segment # 2	CCTA
		36.3	Caldecott Tunnel - Transit Study	CCTA
	$ 1,515,000			

Toll Bridge Seismic Retrofit Program Report
For the Legislature and Governor
August 2004 (Original Edition August 16)
August 22, 2004

Errata Sheet

Page 7: format – acronym BATA defined as "Bay Area Toll Authority (BATA)".

Page 9: format - bulleted paragraph spacing corrected and second bullet paragraphs combined.

Page 11: correction – in the cost comparison table the SFOBB East Span Subtotal row, all three columns showed the subtotal amount $2,600 – corrected second and third column subtotals to be $5,130 and $2,530 respectively.

Page 20: correction – first paragraph, capitalized West Span; second paragraph corrected the date of West Span completion from "spring 2004" to "completed in June 2004."

Page 21 and 22: correction – corrected to clarify last paragraph – "The Department has moved forward with an aggressive program to assess bridges in California for seismic retrofit needs. Past reviews of historic bridge performance during large California earthquakes indicate bridges designed after 1971 have performed well and better then pre-1971 bridge designs. This is documented in numerous resources. The Legislature has provided the Department with dedicated resources for seismic research since 1999. This research has provided a better understanding of earthquakes and the performance of bridges during these events. With this knowledge, the Department reassesses the seismic hazard and engineering performance of existing, retrofitted and new structures against the current state of knowledge to ensure that these structures perform in an acceptable manner under anticipated ground motion, including the Dumbarton Bridge across the San Francisco Bay and the Antioch Bridge connecting Antioch and Sherman Island. Research has given us a better understanding of seismic hazards and performance developed over the past decade. At this time, no retrofit is planned for these two toll bridges. It is proposed to begin a Project Initiation Document to identify the scope, cost and schedule for studying these toll bridges. It is unknown if this proposed study will recommend seismic retrofitting. "

Page 25: format – last paragraph read "BATA (BATA)", deleted "(BATA)"

Page 26: format – second paragraph "RM1 (RM1)", deleted "(RM1)"; sixth paragraph "base toll (the Base Toll)", deleted "the".

Page 32: format – in the Appendix B table, in the fourth line revised the spelling of "Cordelia" and corrected tab right of the related $100 million.