
# Antioch/Dumbarton Seismic Evaluation and Toll Bridge Funding Analysis

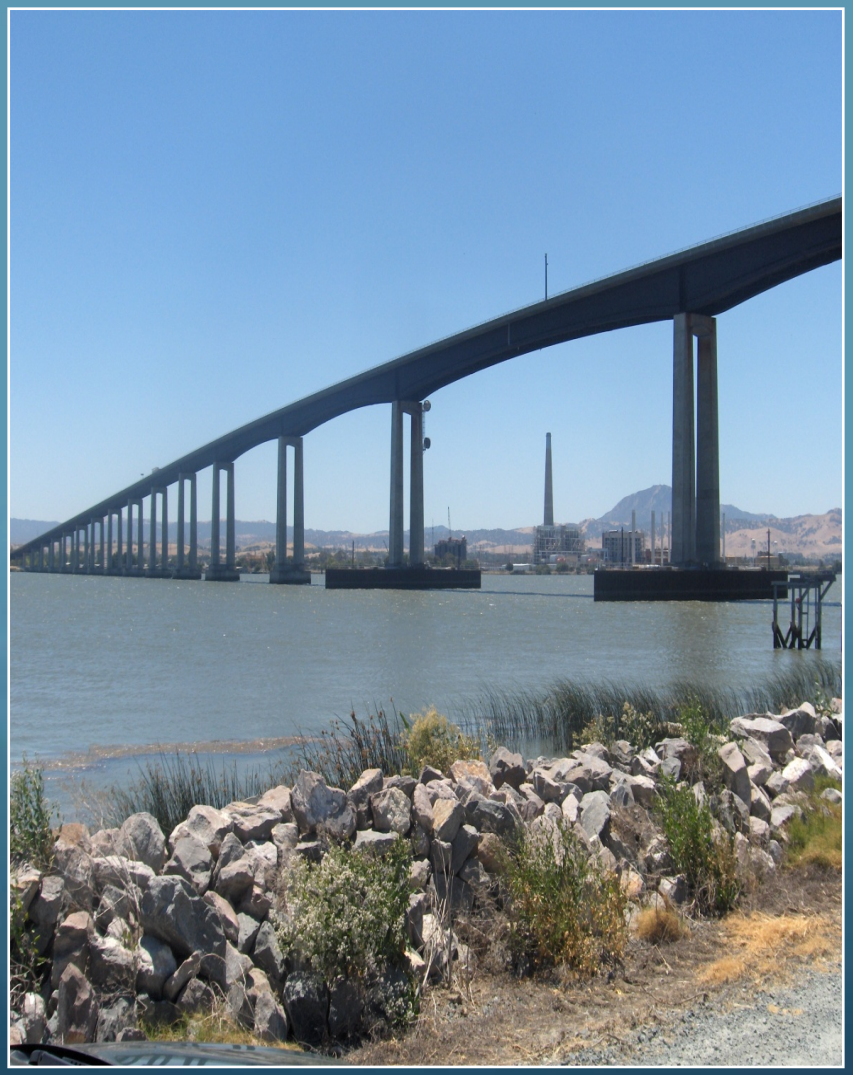
**Bay Area Toll Authority**

December 17, 2008

# Location Map

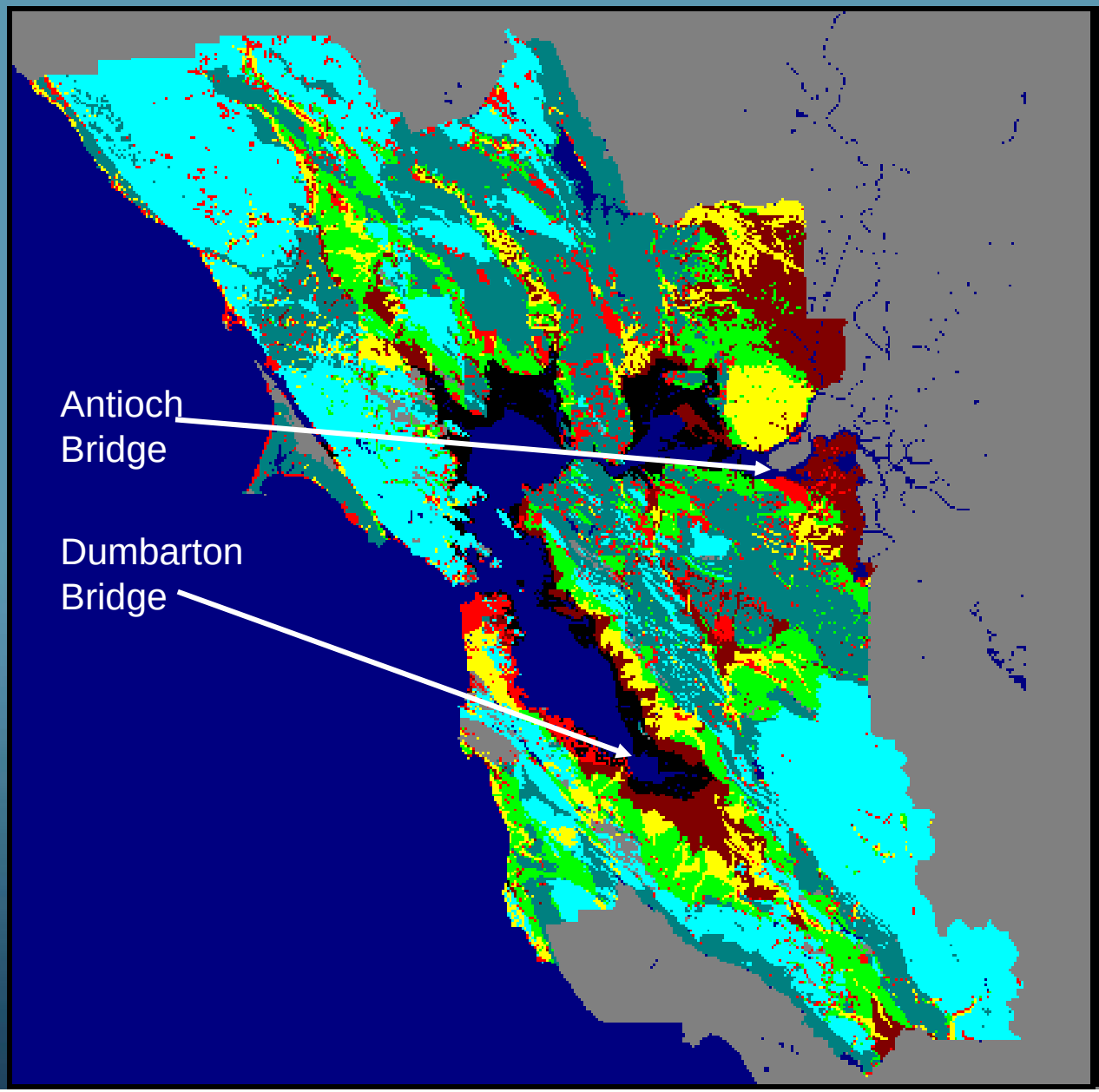
# Antioch Bridge

- **LOCATION:** State Route 160 between Contra Costa and Sacramento counties
- **STRUCTURE:** Steel plate girder
- **LENGTH:** 1.8 miles
- **LANES:** 1 in each direction
- **Average Daily Traffic:** 15,000 (both directions)
- **OPENED:** December 1978



# Dumbarton Bridge

- **LOCATION: Route 84 connecting Alameda and San Mateo Counties**
- **STRUCTURE: Steel box girder and pre-stressed concrete approach spans**
- **LENGTH: Total length 1.6 miles**
- **LANES: 3 in each direction – 1 bicycle pedestrian path**
- **Average Daily Traffic: 60,000** (both directions)
- **OPENED: October 1982**




## GEOLOGIC MATERIALS

SHAKING
AMPLIFICATION

- Extremely High
- Very High
- High
- Moderately High
- Moderate
- Moderately Low
- Low
- Very Low
- Highways
- Streets

Source: ABAG, 1995
"On Shaky Ground"
The map is intended for planning only. Risk levels may be incorrect by one unit higher or lower. Current version of map available on Internet at http://www.abag.ca.gov

# Seismic Evaluation Process

**As part of prudent regular revaluation of structures, Caltrans and BATA have been conducting seismic evaluations and analyses of the Antioch and Dumbarton Bridges over the past 3 years. These studies have identified vulnerabilities in the bridges.**

- **Seismic vulnerability studies completed** — May 2005
- **Geotechnical investigations and analyses completed** — January 2008
- **Modeling and seismic analysis of as-built condition completed** — January 2008
- **Retrofit strategy and cost estimate presented to TBPOC** — November 2008

# Retrofit Criteria for State-Owned Toll Bridges

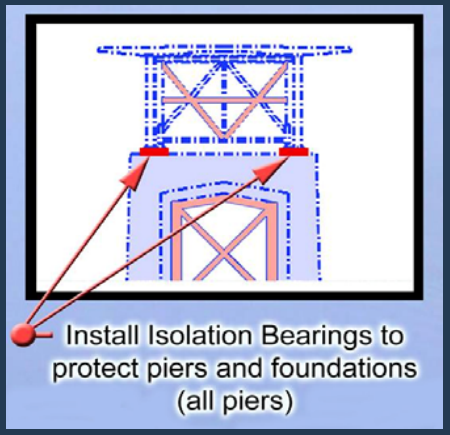
| Bridge | Seismic Criteria | Actual/Projected Completion Date |
|---|---|---|
| **Benicia-Martinez** (new & existing spans) | Lifeline | 2002 – existing |
| | Lifeline | 2007 – new |
| **Carquinez** (new & existing spans) | Intermediate | 2002 – existing |
| | Intermediate | 2003 – new |
| **Richmond-San Rafael** | No collapse | 2005 |
| **San Francisco-Oakland** (west and east spans and west approach) | Lifeline | 2004 – west span |
| | Lifeline | 2009 – west approach |
| | Lifeline | 2013 – east span* |
| **San Mateo-Hayward** | Intermediate | 2000 |
| ***Proposed*** | | |
| **Dumbarton** | Intermediate | 2013** |
| **Antioch** | No collapse | 2012** |

* Under construction
** In Design

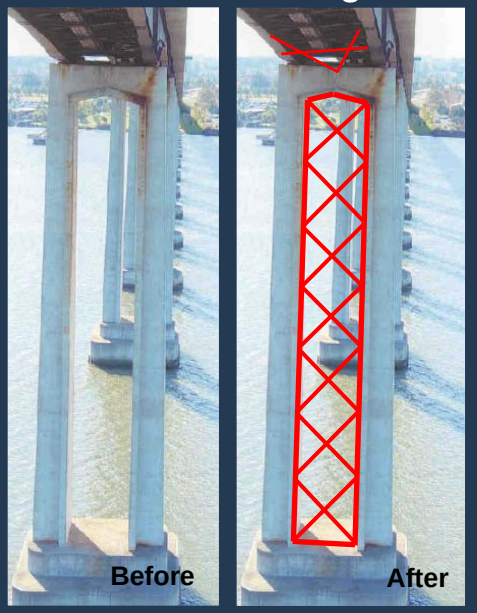
# Antioch Bridge Seismic Retrofit Strategy

- **Pier and Superstructure**
  - Install isolation bearings
  - Strengthen superstructure
  - Strengthen substructure
- **Trestle**
  - Remove existing concrete curtain walls
- **Hinges**
  - Add restraining devices to protect deck hanger systems

**Isolation Bearings**



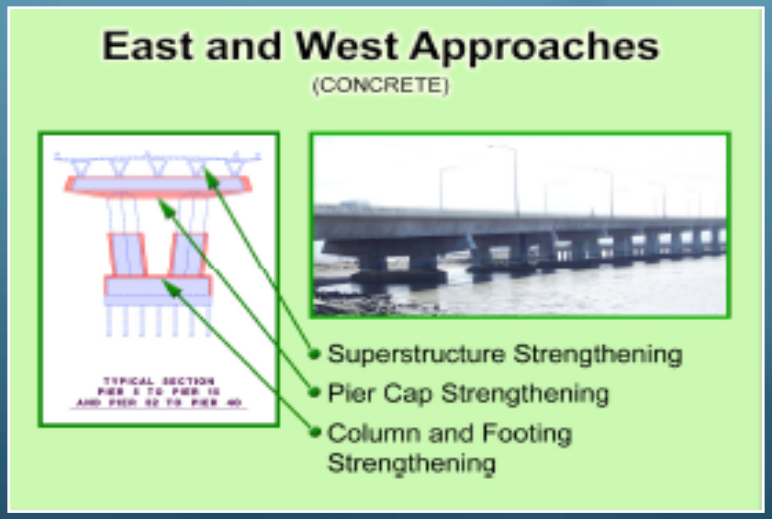

**Cross Bracing**




**Trestle Retrofit**

# Dumbarton Bridge Seismic Retrofit Strategy

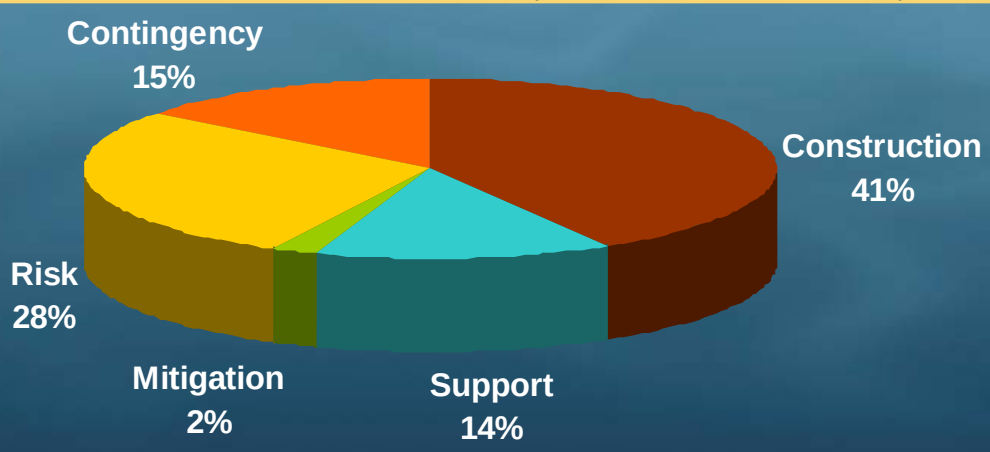
- **Main Channel Crossing**
  - Install isolation bearing
  - Strengthen superstructure
  - Strengthen substructure


- **Approaches**
  - Strengthen superstructure
  - Strengthen substructure

# Total Project Costs - $950 Million

| Description | Antioch ($ Millions) | Dumbarton ($ Millions) |
|---|---|---|
| CONSTRUCTION COST (ESCALATION TO MID YEAR OF CONSTRUCTION) | $125 | $267 |
| CONTINGENCIES | 44 | 94 |
| SUBTOTAL CAPITAL COSTS | 169 | 361 |
| SUPPORT COSTS | 39 | 95 |
| MITIGATION COSTS | 13 | 7 |
| RISK COSTS | 92 | 174 |
| TOTAL COST ESTIMATE | $313 | $637 |



# Additional Information on Costs

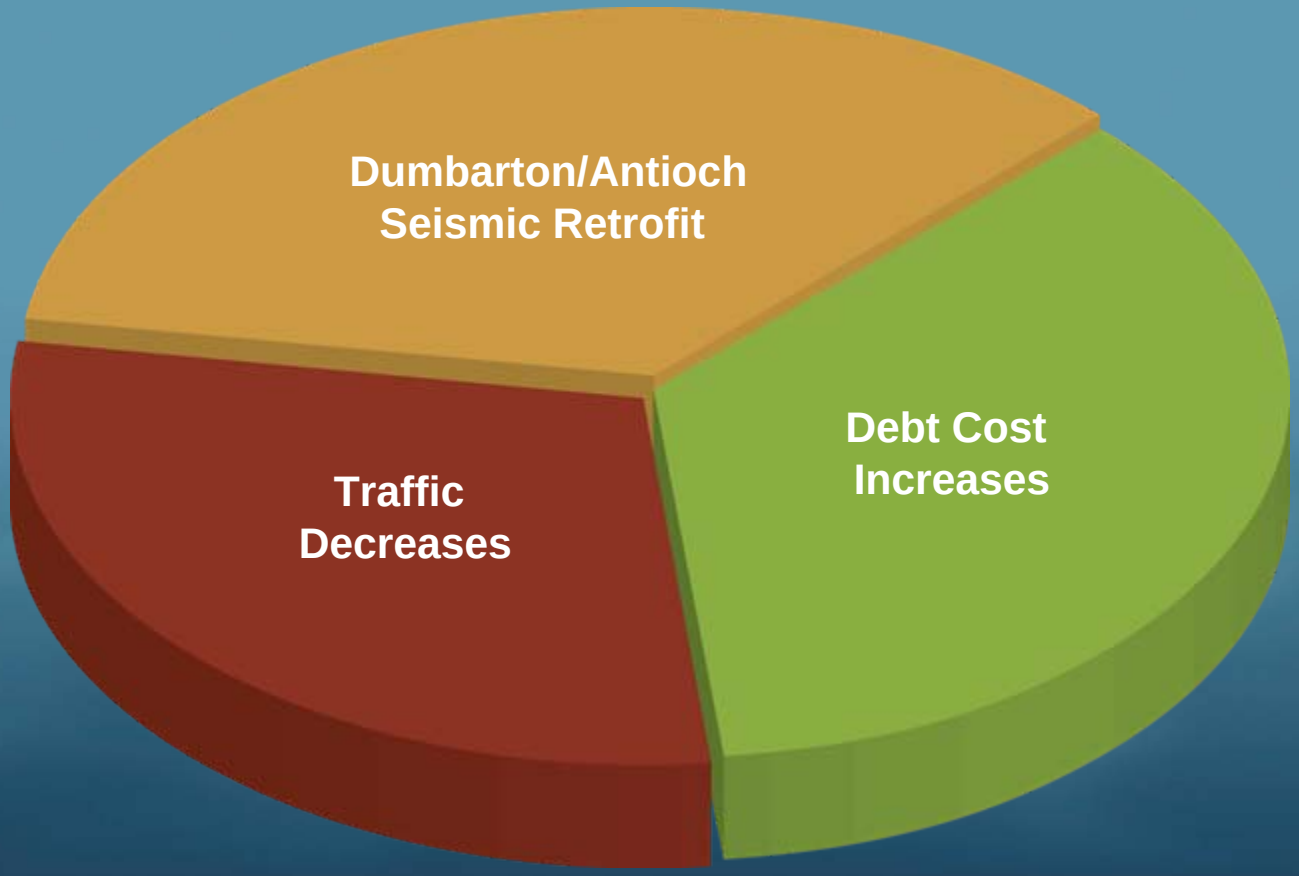
- **Retrofit strategy reflects advances in earthquake engineering over the last 25 years**
- **Incorporates most recent environmental requirements for work in sensitive Bay habitats**
- **Construction cost escalation has been substantial during past decade**
- **Contingency and risk account for almost half of the estimated project costs**

# Project Schedule

| Milestone | Projected Completion Date |
|---|---|
| 100% Plans, Specifications and Estimate | August 2009 |
| Obtain Final Regulatory Agency Permits | September 2009 |
| Award Antioch Construction Contract | April 2010 |
| Award Dumbarton Construction Contract | August 2010 |
| Prototype Bearing Design, Manufacture & Testing | April 2010 |
| Complete Antioch Construction Contract | 2012 |
| Complete Dumbarton Construction Contract | 2013 |

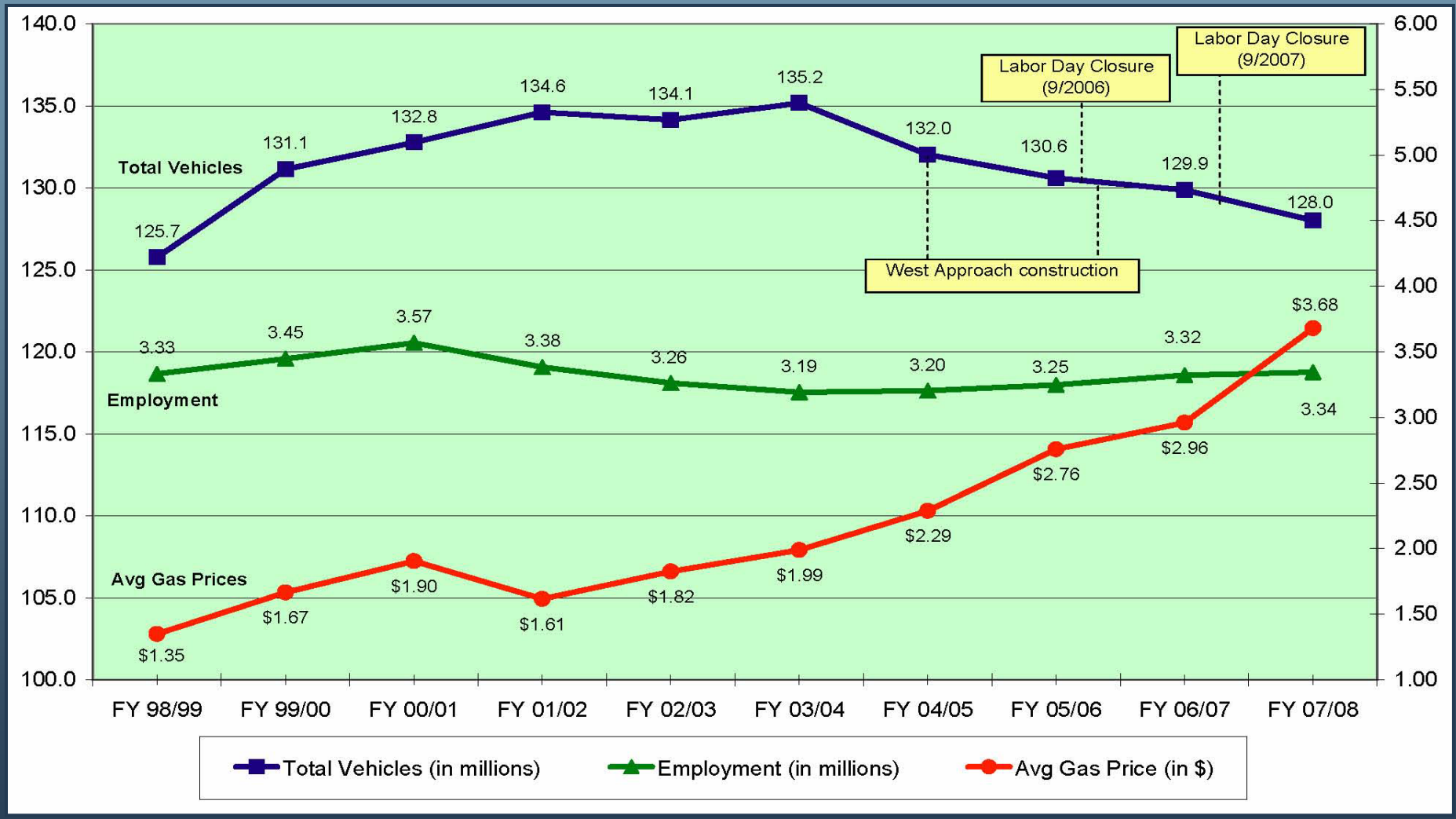
# Toll Bridge Funding Analysis and Strategy

# Major Reasons Requiring the Need to Increase Revenues



# Traffic

## Bridge Traffic Trends, (FY 1999 through FY 2008)




- Traffic has declined due to high gas prices, a weak economy and construction activities on the bridges.

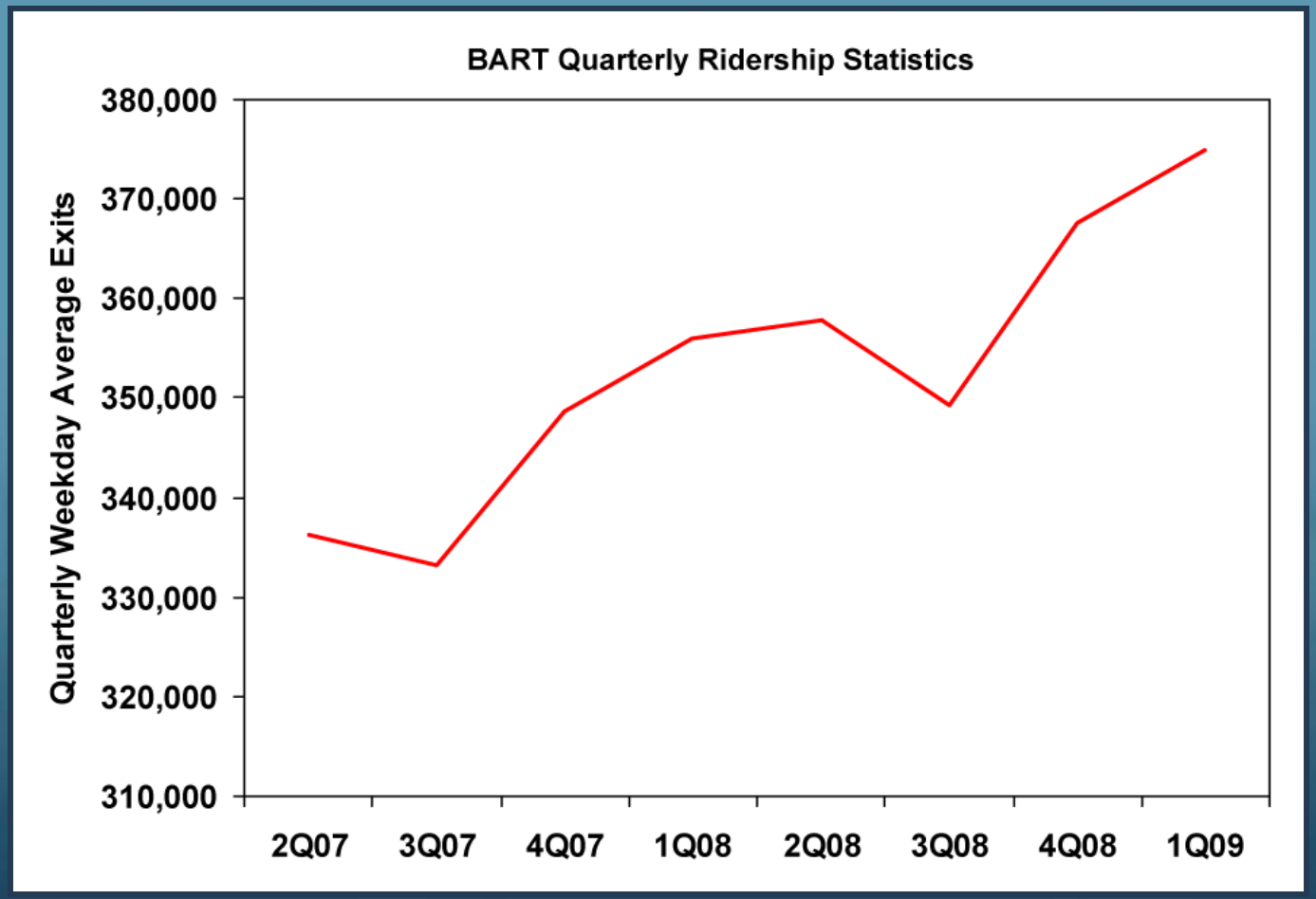
# Traffic

## Average Daily Traffic, (FY 2007-08/FY 2008-09, Q1)

| Bridge | Average Daily Vehicles | | % Difference |
|---|---|---|---|
| | FY 2007-08 First Quarter | FY 2008-09 First Quarter | |
| Antioch | 7,820 | 6,901 | -11.8% |
| Benicia-Martinez | 51,793 | 50,986 | -1.6% |
| Carquinez | 63,203 | 59,056 | -6.6% |
| Richmond-San Rafael | 35,876 | 34,498 | -3.8% |
| San Francisco-Oakland Bay | 127,930 | 125,506 | -1.9% |
| San Mateo-Hayward | 47,181 | 43,310 | -8.2% |
| Dumbarton | 30,090 | 28,692 | -4.6% |
| TOTAL | 363,893 | 348,949 | -4.0% |

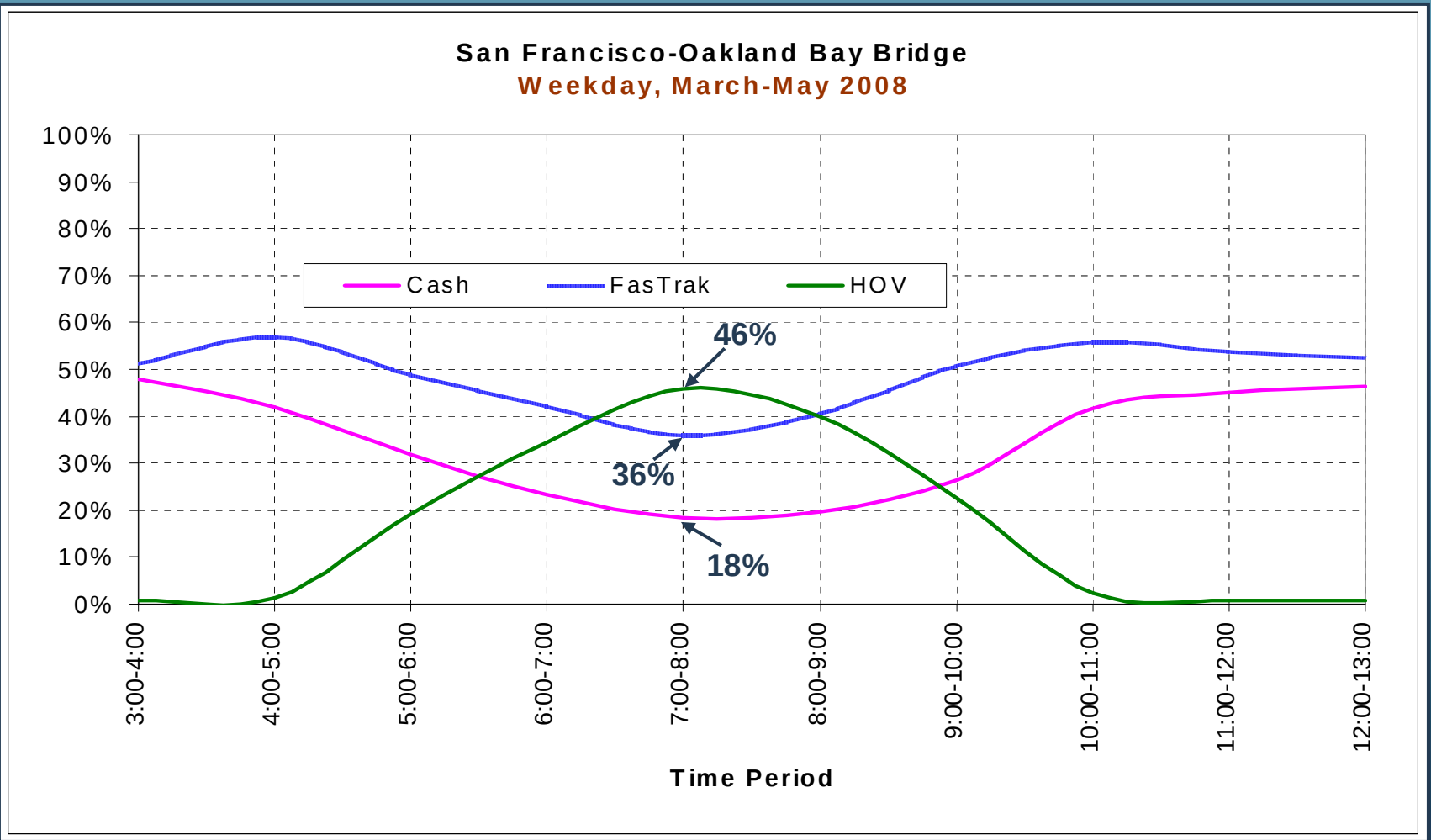
# Traffic

## BART Quarterly Ridership, (FY 2006-07 -- FY 2008-09)



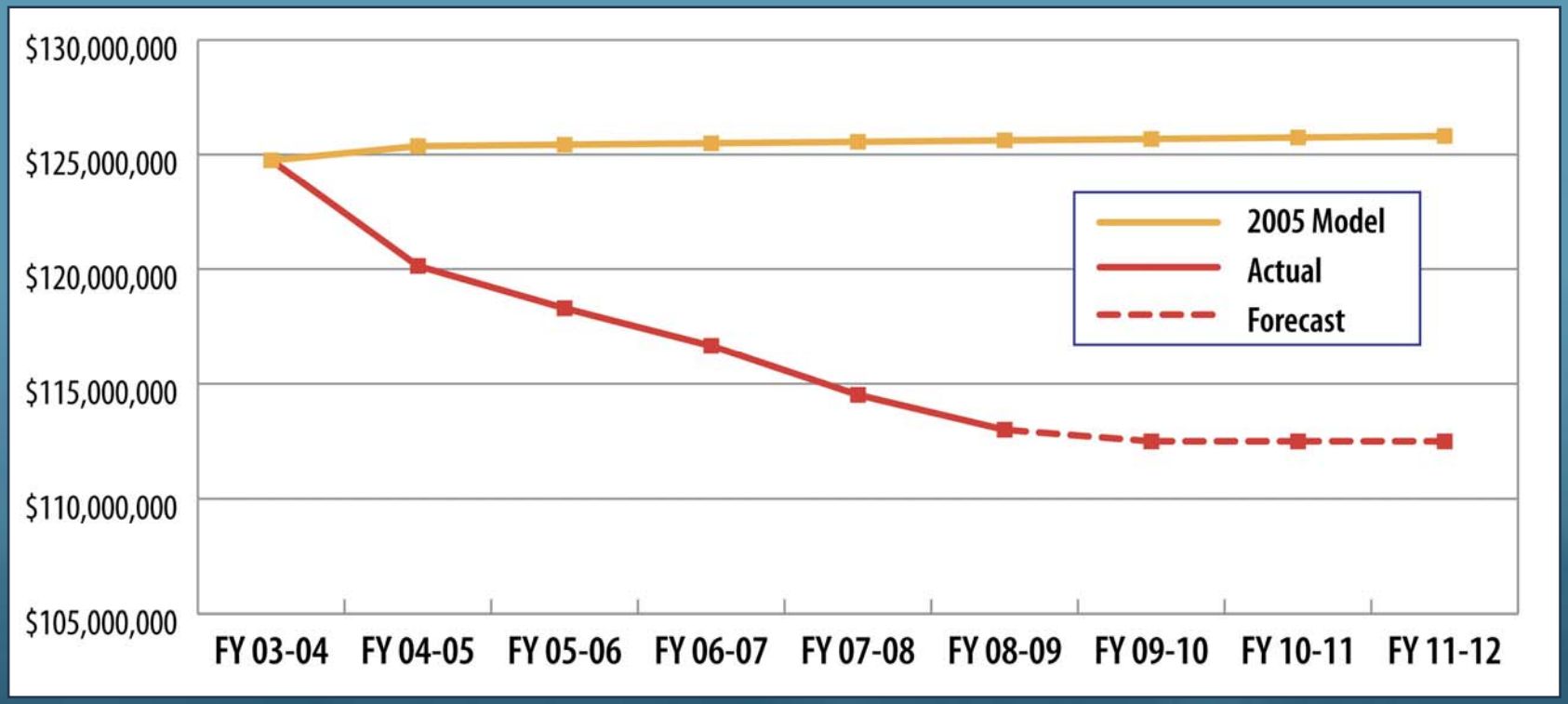
# Traffic

## San Francisco-Oakland Bay Bridge
## Volume – Payment Type (%) [Weekday AM Peak]



# Traffic

## Actual Toll Paying Traffic vs. Assumed Toll Paying Traffic in 2005 Finance Model




- Reduction in toll paying traffic accounts for about $30 million in reduced annual revenues from 2005 model forecasts.

# Debt Costs

## Current Forecast of Debt Cost vs. Assumed Debt Costs In 2005 Finance Model

| | 2005 Assumptions | 2008 Assumptions |
|---|---|---|
| Term | 30-40 Years | 30 Years |
| Product | Traditional Fixed – 33% | Traditional Fixed – 64% |
| Future Interest Cost | 3.56% - 5.86% | 6.25% - 6.75% |

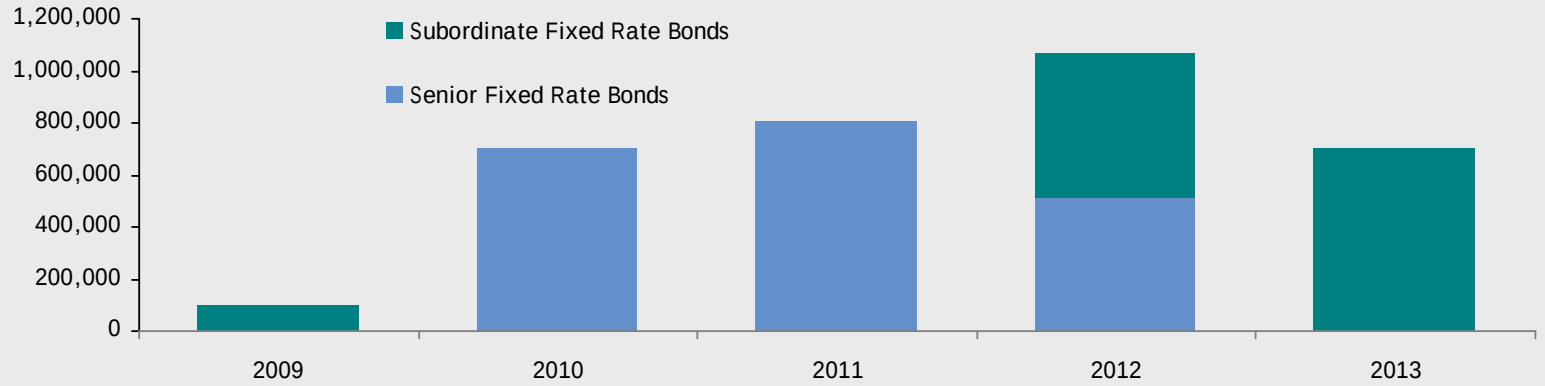
- Increased debt cost accounts for about $35 million in added annual costs from 2005 model forecast.

# Debt Costs

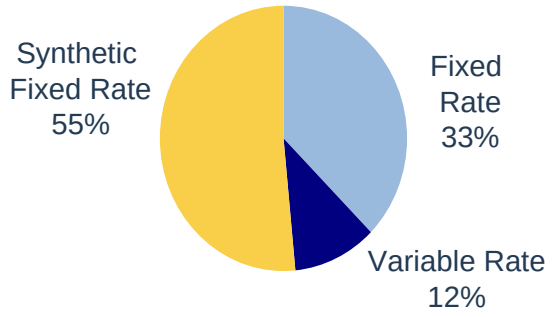
## Proforma Debt Profile

- The new finance model conservatively relies on a much greater amount of traditional fixed rate debt

**Borrowing Plan**

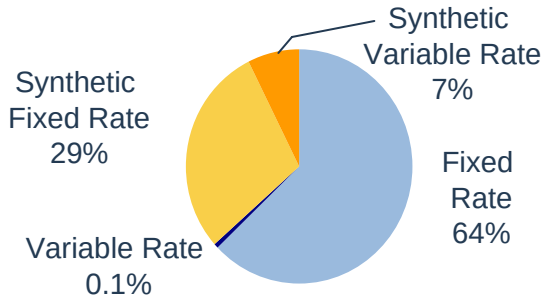



**2005 Finance Model**
At Completion of Plan of Finance




**Total Debt Outstanding = $6.4 billion**

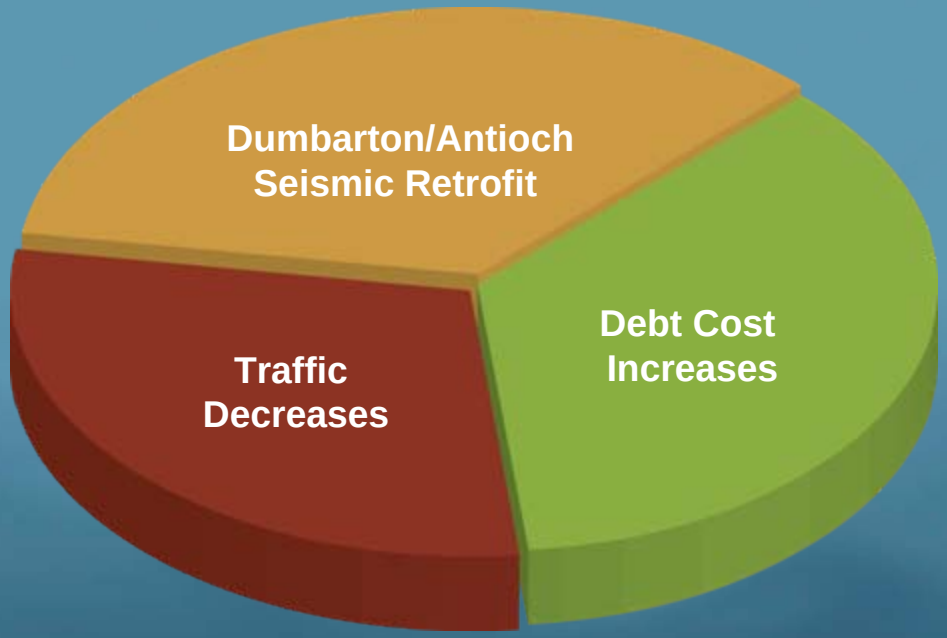
**2008 Finance Model**
**At Completion of Plan of Finance**




**Total Debt Outstanding = $7.5 billion**

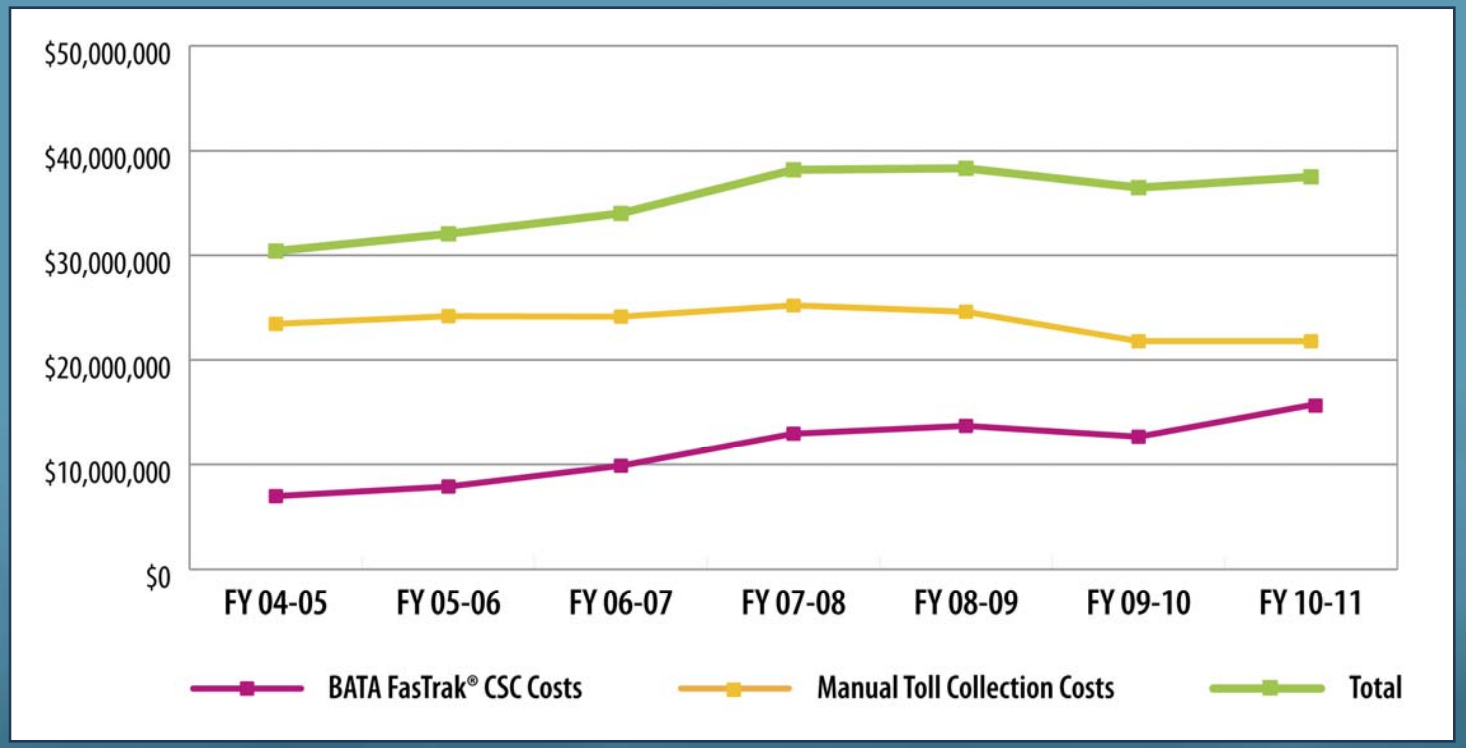
# Funding Strategy

- Pursue operating cost savings
- Improve toll violation collections
- Seek other funding sources for seismic projects
- Evaluate toll revenue options



# Toll Collection Costs

## Manual Toll Collections




- **Potential $2.8 million annual savings in Caltrans manual toll collections costs.**
  - Implementation of additional FasTrak®-only lanes (current peak FasTrak use is about 60%).
  - Staffing reductions in manual lanes through attrition.

# Toll Collection Costs
# State Administrative Overhead

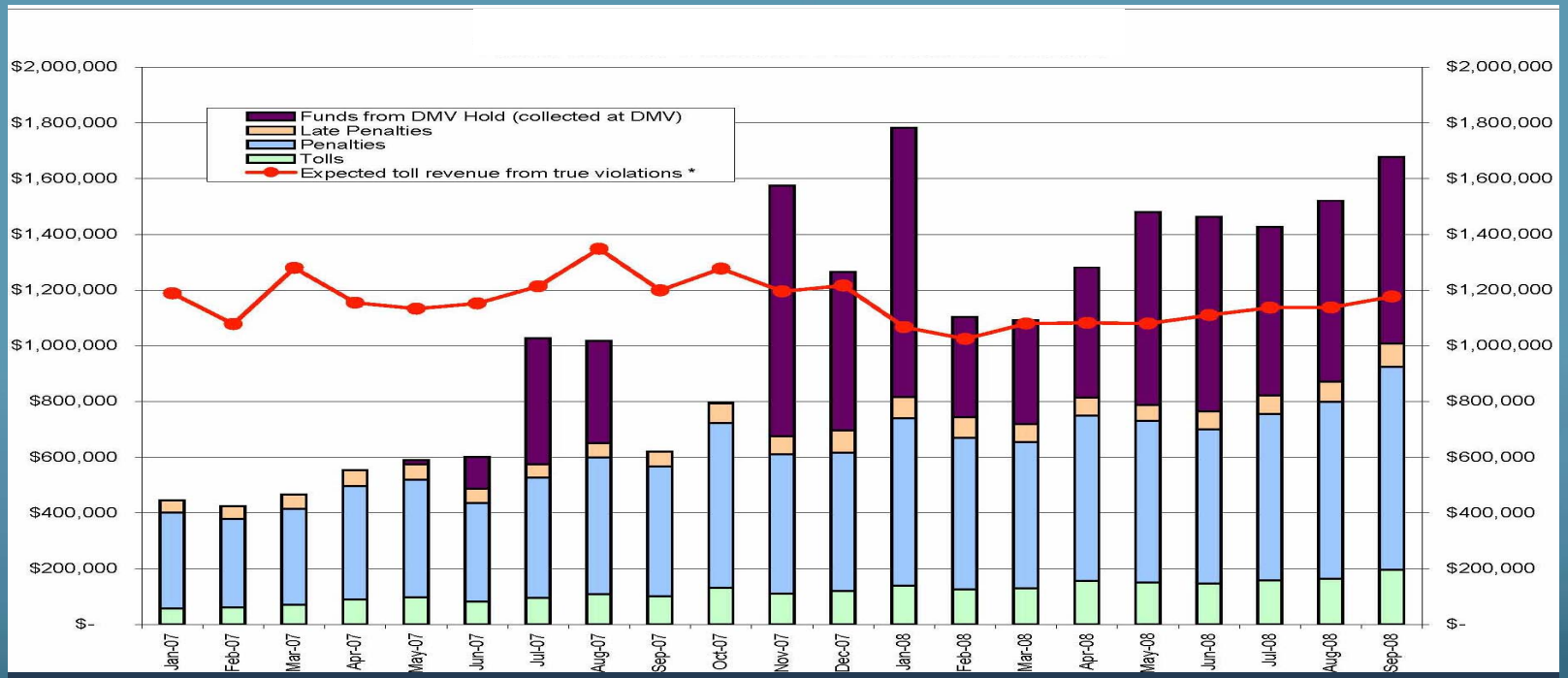
- BATA pays for normal toll collection overhead items and on top of that pays a state administrative overhead.

| | FY 2006-07 | FY 2007-08 | FY 2008-09 |
|---|---|---|---|
| Toll Collections Staff (PYs) | **342** | **339** | **326** |
| Toll Collections Budget | | | |
| Salaries/Benefits | $ 18,511,157 | $ 18,918,801 | $ 18,042,721 |
| State Admin. Overhead | 4,498,212 | 5,272,681 | 5,540,920 |
| TOTAL | **$23,009,369** | **$24,191,482** | **$23,583,641** |
| Overhead Rate | **24%** | **28%** | **31%** |

- Potential $5.5 million annual savings if state overhead expense is eliminated.

# Toll Violation Revenues

## Expected Toll Revenue/Actual Violation Revenue




| | FY 2006-07 | FY 2007-08 |
|---|---|---|
| Violations (Vehicles) | 3,498,166 | 3,180,981 |
| Expected Revenues | $12,486,303 | $13,073,832 |
| Actual Revenues | $ 5,523,504 | $14,502,873 |
| Net (Loss)/Gain | ($6,962,799) | $ 1,429,041 |

# Toll Violation Revenue Legislative/Policy Proposals

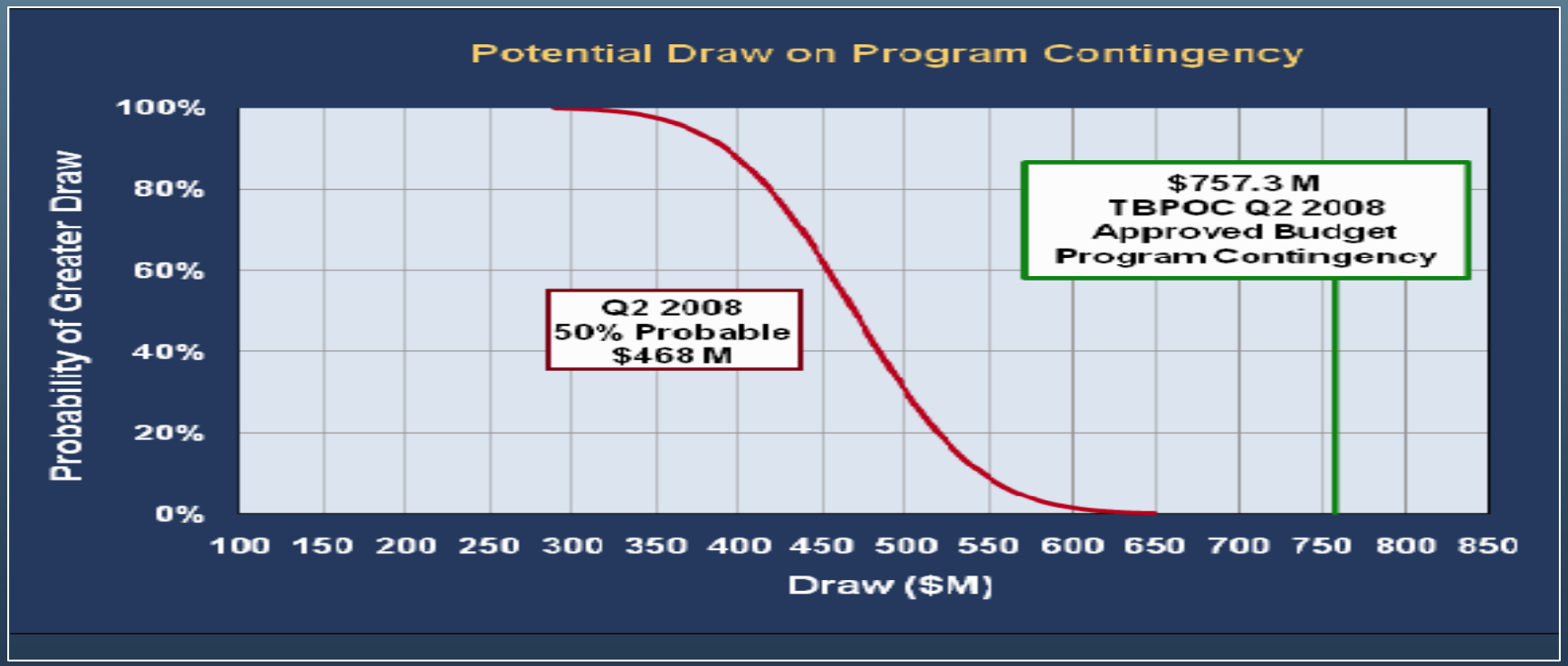
- **Require auto dealers to issue license plates or other vehicle identifier plates**
- **Increase/escalate penalties for motorists with multiple violations**
- **Allow for ability to boot vehicles for motorists that have unpaid violations**

# Other Funding Sources

- **Economic recovery package**
- **Federal authorization in 2009**
- **Include Dumbarton & Antioch Bridges in Toll Bridge Seismic Retrofit Program (TBSRP) – requires state legislation**

# TBSRP Contingency

- **Program has an active risk management plan that is evaluated monthly by the TBPOC.**
- **Based on the risk management model, there is reasonable likelihood of $250 million remaining in the contingency at the end of the East Span construction.**



# Toll Revenue Options

| Vehicle Class | Average Daily Traffic | % of Total |
|---|---|---|
| Autos (Two Axle Vehicles) | 303,723 | 89% |
| Multi-axle Vehicles | 9,630 | 3% |
| Carpools | 27,463 | 8% |
| Total | 340,816 | 100% |

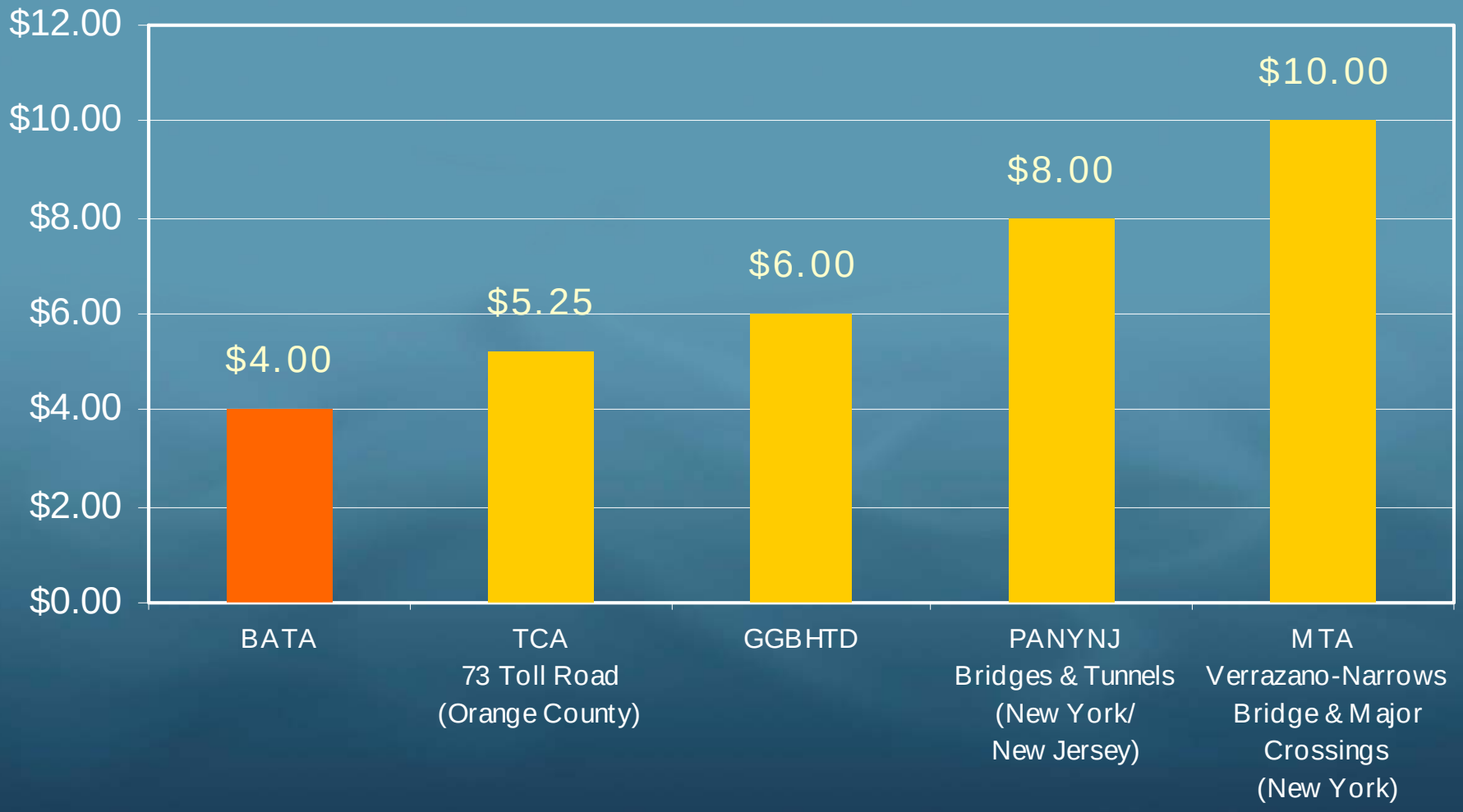
# Toll Revenue Options

## History of Toll Rate Changes by Vehicle Class (1992-2009)

| Vehicle Class | Toll Rates FY 1992 | Current Toll Rates FY 2009 | % Change |
|---|---|---|---|
| Autos (2-axle) | $1.00 | $4.00 | 300% |
| Multi-Axle Vehicles | | | |
| 3-axle | $3.00 | $6.00 | 100% |
| 4-axle | $5.25 | $8.25 | 57% |
| 5-axle | $8.25 | $11.25 | 36% |
| 6-axle | $9.00 | $12.00 | 33% |
| 7+-axle | $10.50 | $13.50 | 29% |
| Carpools | $0.00 | $0.00 | — |

# Toll Revenue Options

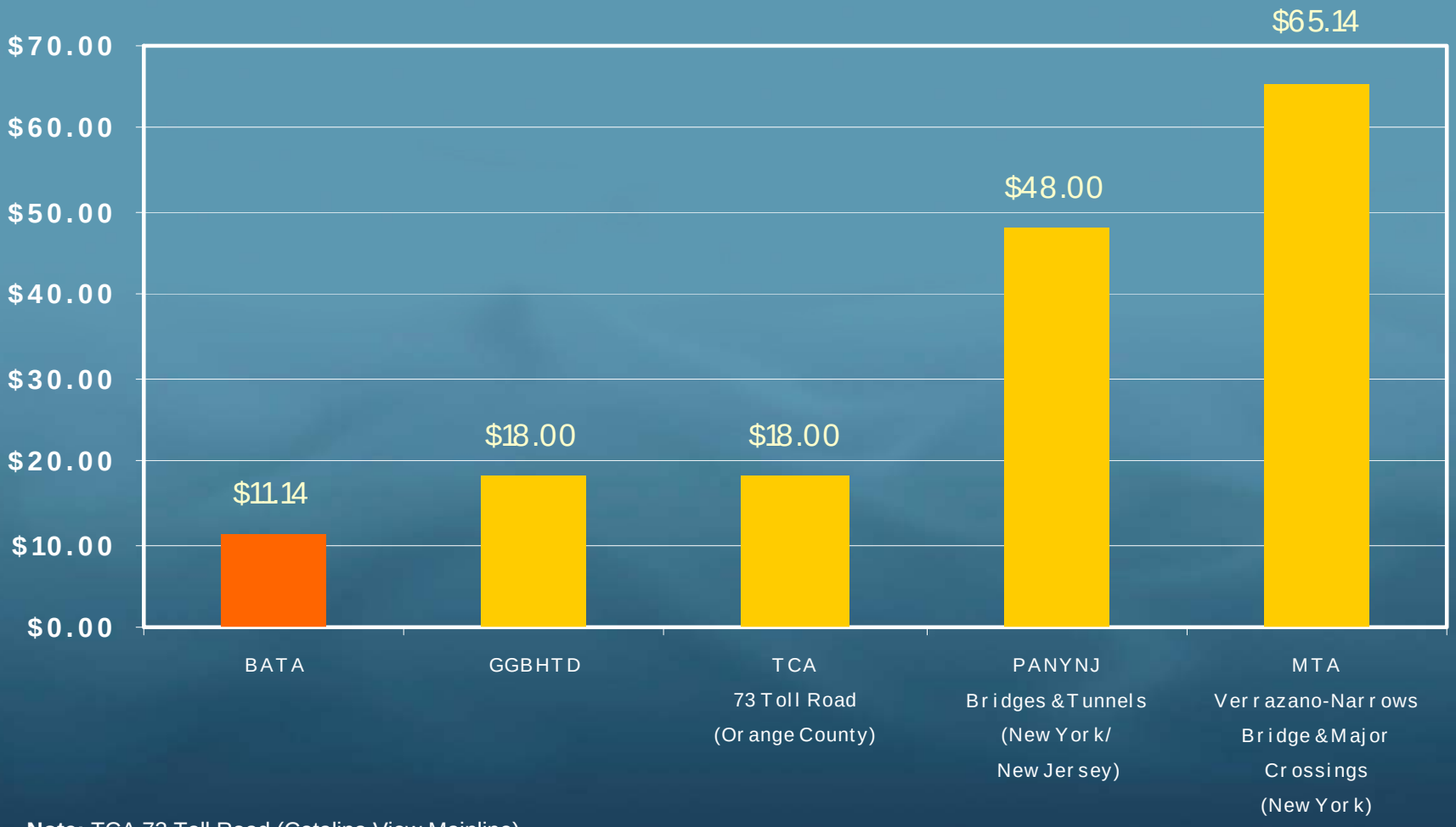
## Comparison of Toll Rates (Cash) for Autos (2-axle Vehicles)




**Note:** TCA 73 Toll Road (Catalina View Mainline).

# Toll Revenue Options

## Comparison of Toll Rates for Multi-Axle Vehicles (Average Tolls (Cash) for 3 through 9 axle Vehicles)




**Note:** TCA 73 Toll Road (Catalina View Mainline).

# Toll Revenue Options

## Comparison of Carpool Toll Rates

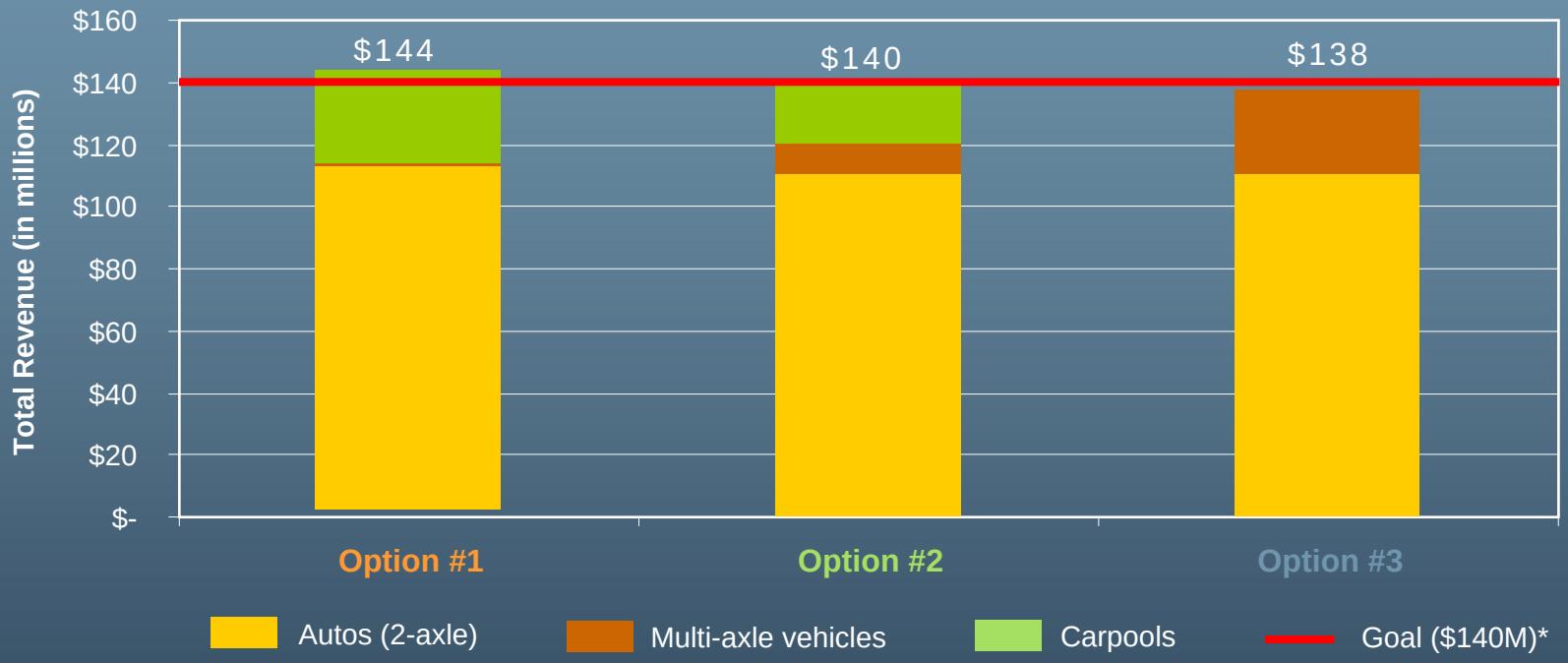
| Agency/ Facility Type | Cash Toll | Charges for Carpools? | Carpool Toll | Occupancy |
|---|---|---|---|---|
| BATA (Bridges) | $4.00 | No | $0 | 3+/2+ |
| GGB (Bridge) | $6.00 | No | $0 | 3+ |
| MTA Verrazano Narrows (Bridge) | $10.00 | Yes | $2.33* | 3+ |
| PANYNJ (Bridges/Tunnels) | $8.00 | Yes | $2.00* | 3+ |
| TCA (Toll Road) | $5.25 | Yes | $5.25 | — |

* Must use staffed lanes and meet enrollment requirements.

- Most other toll roads surveyed do not have reduced rates for carpools.

# Toll Revenue Options

## Options for New Toll Revenue Generation




* New toll revenue goal assumes $250 million in available TBSRP contingency and $5.0 million in annual operating cost savings.

- **Option #1** – $1 surcharge on Autos & Multi-axle vehicles; $3 for Carpools.
- **Option #2** – $1 surcharge on Autos; $3 per axle on Multi-axle vehicles; $2 for Carpools.
- **Option #3** – $1 surcharge on Autos; $5 per axle on Multi-axle vehicles; $0 for Carpools.

# Toll Revenue Options

## Resulting Toll Rates for New Toll Revenue Generation Options

| Vehicle Class | Current Toll | Option #1 | Option #2 | Option #3 |
|---|---|---|---|---|
| | | ▪ $1 surcharge on autos and trucks<br>▪ $3 Carpools | ▪ $1 surcharge on autos and trucks<br>▪ $3 per axle on Multi-axle vehicles<br>▪ $2 Carpools | ▪ $1 surcharge on autos and trucks<br>▪ $5 per axle on Multi-axle vehicles<br>▪ $0 Carpools |
| 2-Axle | $4.00 | $5.00 | $5.00 | $5.00 |
| 3-Axle | $6.00 | $7.00 | $8.00 | $10.00 |
| 4-Axle | $8.25 | $9.25 | $11.00 | $15.00 |
| 5-Axle | $11.25 | $12.25 | $14.00 | $20.00 |
| 6-Axle | $12.00 | $13.00 | $17.00 | $25.00 |
| 7+-Axle | $13.50 | $14.50 | $20.00 | $30.00 |
| Carpool | $0.00 | $3.00 | $2.00 | $0.00 |

# Legislative Considerations

- **Add Antioch/Dumbarton retrofits to Toll Bridge Seismic Retrofit Program**
- **Eliminate State administrative overhead on toll operations**
- **Obtain congestion pricing authority**
- **Obtain Regional Measure authority**
- **Obtain HOT Network implementation authority**

# Next Steps

## BATA Review/Approvals

- Legislative strategy (January 2009)
- Fund allocation for Antioch/Dumbarton prototype bearings (January 2009)
- FasTrak® Strategic Plan Update (February 2009)
- Dumbarton/Antioch bid advertisement (January 2010)
- Toll increase takes effect (2010)


http://bata.mtc.ca.gov