Executive Summary

• The San Francisco Bay Crossings Study Update (2012) is an update of the 2000 San Francisco Bay Crossings Study

• Current and Projected Conditions
  – Peak hour demand on the existing bridges will exceed capacity by more than 20% by 2035
  – The number of daily transbay person-trips is expected to increase by 33% between 2010 and 2035
  – BART ridership will exceed Transbay Tube capacity by 2025

• Alternatives Update
  – Due to reduced travel demand projections, reduced tolling revenue, and increased environmental / construction costs none of the updated alternatives from the previous study were recommended for further study
Executive Summary

• BART Crossing Alternatives
  – Three potential BART crossing alignments were identified and studied
  – The potential BART crossings would introduce forced transfers and increase travel time for most BART passengers and were therefore not recommended for further study

• Transit Improvement Alternatives
  – Four transit improvement alternatives were identified
  – Transit improvement alternatives are recommended for further study

• Highway Approach Improvement Alternatives
  – 19 approach improvement alternatives were identified and studied
  – Four approach improvements were recommended for further study
## Executive Summary
### Summary of Alternatives

<table>
<thead>
<tr>
<th>Alternative</th>
<th>Cost (FY2011$)</th>
<th>Recommended for Further Study</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Alternatives Recommended in Previous Studies</strong></td>
<td></td>
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<tr>
<td>New Multimodal Midbay Bridge / Tunnel – SR 238 to I-380</td>
<td>$12,400,000,000</td>
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<tr>
<td>Widening of San Mateo Bridge</td>
<td>$2,900,000,000</td>
<td>No</td>
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<tr>
<td>Dumbarton Bridge Approach Improvements</td>
<td>$2,900,000,000</td>
<td>No</td>
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<tr>
<td><strong>BART Crossing Alternatives</strong></td>
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<tr>
<td>Northern Crossing Alignment</td>
<td>$8,200,000,000</td>
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<tr>
<td>Midway Crossing Alignment</td>
<td>$9,100,000,000</td>
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</tr>
<tr>
<td>Southern Crossing Alignment</td>
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<td><strong>Transit Improvement Alternatives</strong></td>
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<tr>
<td>BART Station Capacity Enhancements – Saddlebags</td>
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<tr>
<td>BART Skip-Stop “Metro” Service Plan</td>
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<td>East Bay Bus Terminal</td>
<td>NA</td>
<td>Yes</td>
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<td>Bus Service Expansions</td>
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<td><strong>Highway Approach Improvement Alternatives</strong></td>
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<tr>
<td>1 Mandela Parkway Bus Ramp</td>
<td>$46,200,000</td>
<td>No</td>
</tr>
<tr>
<td>2 MacArthur Boulevard Bus Ramp</td>
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</tr>
<tr>
<td>3 Maritime Street HOV Lane Addition</td>
<td>$19,600,000</td>
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</tr>
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## Executive Summary

### Summary of Alternatives

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<tr>
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<tbody>
<tr>
<td>4   SR 24 to I-80 HOV Bypass</td>
<td>$439,400,000</td>
<td>No</td>
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<tr>
<td>5   Powell Street / I-80 Ramps Intersection - HOV Improvement</td>
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<tr>
<td>6   I-880 HOV Lane Merge - Lane Removal</td>
<td>$114,000</td>
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<tr>
<td>7   I-880 HOV Lane Merge - Lane Extension</td>
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<td>10  US 101 to Cesar Chavez Street HOV Lane Addition</td>
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<td>11  Cesar Chavez to US 101 HOV Lane Addition</td>
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<td>Yes</td>
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<td>16  Dumbarton Bridge Open Road Tolling</td>
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</tr>
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<td>19  Newark Boulevard Westbound HOV Ramps</td>
<td>$24,400,000</td>
<td>No</td>
</tr>
</tbody>
</table>
Executive Summary

• Conclusions
  – No new highway bridge crossing is recommended for further study
  – No new BART crossings are recommended for further study
  – Four highway approach and four transit improvements are recommended for further study
  – The four recommended highway approach improvements would have a total cost (FY2011$) of $20,348,000 and would require a $0.01 toll increase on all 7 bridges to fund

• Next Steps
  – Study recommended highway approach improvements further
  – Midbay auto and BART improvements should be re-evaluated when warranted by transbay travel demand
  – Recommended improvements should be considered as part of any future toll increase expenditure plan
Introduction
Introduction

• Current and Projected Conditions
• Alternatives Update
• BART Crossing Alternatives
• Transit Improvement Alternatives
• Highway Approach Improvement Alternatives
• Next Steps
Current and Projected Conditions
Current and Projected Conditions

Summary

• The San Francisco Bay Crossings Study Update (2012) is an update of the 2000 San Francisco Bay Crossings Study (previous study)

• 2010 (existing) daily transbay person-trips decreased since 2000 (previous study)

• The number of daily transbay person-trips is expected to increase by 33% between 2010 and 2035

• Peak hour demand is projected to exceed the capacity of the Bridge and BART Transbay crossings prior to 2035
Current and Projected Conditions
2000 vs. 2010 Volumes

- 2000:
  - 490,000 Total
  - 15,200 Bus
  - 10,300 Truck
  - 529,200 Non-HOV
  - 160,700 BART

- 2010:
  - 450,000 Total
  - 9,900 Bus
  - 175,500 BART
  - 46,300 HOV
  - 243,400 Non-HOV

Average Weekday Person-Trips

Bay Bridge

- 2000:
  - 529,200 Total
  - 4,900 Ferry
  - 110,700 BART
  - 75,000 SOV

- 2010:
  - 529,200 Total
  - 4,500 Ferry
  - 10,300 Truck
  - 79,300 SOV

San Mateo Bridge

- 2000:
  - 92,600 Total
  - 150,700 BART
  - 75,400 SOV

- 2010:
  - 96,700 Total
  - 10,800 HOV
  - 73,300 SOV

Dumbarton Bridge

- 2000:
  - 3,400 Total
  - 2,900 Truck
  - 75,400 SOV

- 2010:
  - 3,400 Total
  - 1,500 Truck
Current and Projected Conditions
2000 vs. 2010 Observations

- The following changes to transbay travel demand were observed since 2000:
  - HOV Person-Trips = -37%
  - Total Vehicle-Trips = -2%
  - BART Passengers = +9%
  - Bus Passengers = -29%
Current and Projected Conditions
2025 vs. 2035 Volumes
Current and Projected Conditions
2025 vs. 2035 Observations

The following changes to transbay travel demand between the 2025 and 2035 projections are:

- HOV Person-Trips = +15%
- Total Vehicle-Trips = -22%
- BART Trips = -12%
- Bus Trips = -36%
Current and Projected Conditions
2010 vs. 2035 Volumes

2010
- 255,100 Non-HOV
- 112,400 HOV
- 224,000 BART
- 12,800 Bus
- 3,700 Truck
- 36,000 Ferry
- 97,700 SOV
- 66,500 SOV
- 28,400 HOV
- 11,000 Dumbarton Rail

2035
- 12,400 Bus
- 3,700 Truck
- 19,100 HOV
- 79,700 SOV
- 28,400 HOV
- 11,000 Dumbarton Rail

TOTAL
- 644,000
- 119,100
- 119,900
- 79,500

Average Weekday Person-Trips
- 600 Truck
- 200 Bus
- 243,400 Non-HOV
- 175,500 BART
- 640 Truck
- 46,300 HOV
- 3,600 Truck
- 1,400 Bus
- 8,000 HOV
- 79,700 SOV
- 3,600 Truck
- 1,400 Bus
- 79,700 SOV
- 3,600 Truck
- 1,400 Bus
- 79,700 SOV
Current and Projected Conditions
2010 vs. 2035 Observations

• The following increases in daily transbay demand / ridership are expected between 2010 and 2035:

  – Vehicle-Trips = +95,000

  – Transit-Trips = +90,000

  – BART Passengers = +50,000
Current and Projected Conditions
2010 vs. 2035 Observations

• The increases in transbay demand / ridership are expected to result in the following consequences:

  – Peak hour demand on the existing transbay bridges will exceed capacity by more than 20% by 2035

  – Significant delay will occur at the bridge approaches (the approaches constrain bridge capacity)

  – BART ridership will exceed Transbay Tube capacity by 2025

  – Bus ridership will be constrained by inefficient routes and redundant service
Alternatives Update
Alternatives Update

Summary

• Alternatives recommended in 2000 (previous study) were updated and re-evaluated, including:
  – New Multimodal Midbay Bridge / Tunnel – SR 238 to I-380
  – Widening of San Mateo Bridge
  – Dumbarton Bridge Approach Improvements

• Due to reduced travel demand projections, reduced tolling revenue, and increased environmental / construction costs, none of the updated alternatives from the previous study are recommended for further evaluation at this time

• Crossing alignments assessed in the previous study are not included because they were fully vetted in the 2007 Regional Rail Plan
• Midbay crossing would result in the following:
  – Daily vehicle-trips that would utilize the Midbay crossing:
    – Previous study: 83,000
    – Current study: 61,300
  – Change in daily vehicle-trips that would cross the Bay (due to new bridge):
    – Previous study: +25,000
    – Current study: +27,100
  – Cost (FY2011$):
    – Previous study: $6.6B to $8.2B
    – Current study: $10.0B to $12.4B
  – Net Toll Increase:
    – 4 Bridges = $8
    – 8 Bridges = $5
Alternatives Update
Widening of San Mateo Bridge

• San Mateo Bridge widening would result in the following:
  – Daily vehicle-trips that would utilize the widened bridge:
    – Previous study: 158,000
    – Current study: 125,800
  – Change in daily vehicle-trips that would cross the Bay:
    – Previous study: +2,100
    – Current study: -2,900
  – Cost (FY2011$):
    – Previous study: $1.8B to $2.4B
    – Current study: $2.3B to $2.9B
  – Net Toll Increase:
    – 3 Bridges = $2
    – 7 Bridges = $1
Alternatives Update
Dumbarton Bridge Approach Improvements

• Approach improvements would result in the following:
  – Daily vehicle-trips that would utilize the approach:
    – Previous study: 20,900
    – Current study: 23,700
  – Cost (FY2011$):
    – Previous study: $0.7B to $1.9B
    – Current study: $1.0B to $2.9B
  – Net Toll Increase:
    – 3 Bridges = $2
    – 7 Bridges = $1
BART Crossing Alternatives
BART Crossing Alternatives

Summary

• Three potential new BART crossing alignment alternatives were identified and studied:
  – Northern Crossing alignment
  – Midway Crossing alignment
  – Southern Crossing alignment

• The potential BART crossings would introduce forced transfers and would increase travel time for most BART passengers and are not recommended

• Additional BART transbay capacity would make the most sense in the Bay Bridge corridor
BART Crossing Alternatives
Northern Crossing Alignment

• Cost (FY2011$): $8,200,000,000

• This alignment would facilitate an airport-to-airport connector between SFO and OAK

• This alternative would introduce forced transfers and increase travel time for most BART passengers and was thus not recommended
BART Crossing Alternatives
Midway Crossing Alignment

• Cost (FY2011$): $9,100,000,000

• This alignment offers a direct route for passengers traveling from the East Bay to the SF / Peninsula trunk line and would offer a direct connection between SFO and OAK

• This alternative could reduce demand on the Transbay Tube by up to 22%. However, it would increase travel time for most passengers and was thus not recommended
BART Crossing Alternatives
Midway Crossing Alignment

• The Midway Crossing Operating Plan would provide Service on at headways of 7.5 minutes

• The Operating Plan would result in the following:
  – Travel time benefits for approx. 2,500 daily riders = 13 min.
  – Travel time increases for approx. 120,000 daily riders = 2.5 min.
  – Net travel time increase = 3,700 daily person-hours
BART Crossing Alternatives
Southern Crossing Alignment

- Cost (FY2011$): $11,200,000,000
- This alternative may reduce demand on the Transbay Tube by up to 9%
- This alternative would introduce forced transfers and would increase travel time for most BART passengers and was thus not recommended
Transit Improvement Alternatives
Transit Improvement Alternatives

Summary

• Transit Improvement Alternatives include:
  – BART Station Capacity Enhancements
  – BART Skip-Stops
  – East Bay Bus Terminal
  – Bus Service Expansions

• BART Capacity Enhancements would increase the capacity of the Transbay Tube and are recommended for implementation before 2025 when daily systemwide ridership reaches approximately 500,000 passengers
Transit Improvement Alternatives
BART: Capacity Expansion

• “Saddlebags” at Embarcadero and Montgomery Stations will be necessary once daily systemwide ridership reaches 500,000 passengers (expected by 2025)

• “Saddlebags” will improve the capacity within the Transbay Tube

• Side platforms will improve:
  – Side passenger boarding
  – Vertical circulation
  – Platform density
Transit Improvement Alternatives
BART: Capacity Expansion

• The estimated cost (FY2011$) of the BART capacity improvements including side platform tunnel and vertical circulation shafts is:
  – Embarcadero Station: $277,500,000
  – Montgomery Station: $171,800,000

• The total estimated cost (FY2011$) of the BART capacity improvements is approximately $449,300,000
Transit Improvement Alternatives
BART: East Bay and West Bay Skip-Stops w/ new San Francisco Alignment

• Currently, the stations at both ends of the Tube constrain transbay BART operations

• Introducing a skip-stop configuration would significantly increase the capacity of the Transbay Tube

• Implementation would be necessary once daily systemwide ridership reaches 500,000 passengers (expected by 2025)

• Improvements would be necessary on both sides of the bay in order to sufficiently increase transbay capacity

• Cost: N/A
Transit Improvement Alternatives
BART: East Bay and West Bay Skip-Stops with San Francisco Improvements

• West Bay Skip-Stop with San Francisco Improvements
  – Skip-stop would allow trains to bypass the existing platform
  – New alignment could serve Embarcadero and Montgomery Stations

• East Bay Skip-Stop
  – Skip-stop configuration would increase Transbay Tube capacity
  – There are several proposed skip-stop configurations
Transit Improvement Alternatives

Bus: East Bay Terminal and Bay Bridge Shuttle

• Currently 25 routes are provided between the East Bay and San Francisco

• Could be consolidated at “transit node”

• Shuttle would provide service between East Bay “transit node” and Transbay Terminal

• This would:
  – Improve service frequency
  – Reduce resource needs

• Cost: N/A
Transit Improvement Alternatives
Bus: AC Transit Service Expansion in San Francisco

• AC Transit only serves the Transbay Terminal in San Francisco
• This would reduce the need for passengers transfer to another transit service
• Additional destinations could include:
  – Caltrain Station – 4th and King
  – Mission Bay
  – Cesar Chavez
Highway Approach Improvement Alternatives
Highway Approach Improvement Alternatives

Summary

• 19 Highway Approach Improvement Alternatives were identified on the bridge approaches

• Four Highway Approach Improvement Alternatives were recommended for further study:
  – Alternative 2: MacArthur Boulevard Bus Ramp
  – Alternative 5: Powell Street / I-80 Ramps Intersection – HOV Improvement
  – Alternative 15: San Mateo Bridge Open Road Tolling
  – Alternative 16: Dumbarton Bridge Open Road Tolling
Highway Approach Improvement Alternatives

Summary

• Total cost of the four recommended alternatives (FY2011$): $20,348,000

• Construction would require $0.01 toll increase on all 7 bridges to fund
Highway Approach Improvement Alternatives

Highway Approach Improvement Alternative Locations

Bay Bridge (Eastern Approach) Improvement Alternatives

- Alternative 1: Martin Luther King Jr. Freeway Bus Ramp
- Alternative 2: MacArthur Boulevard Bus Ramp
- Alternative 3: Martin Luther King Jr. Freeway Lane Addition
- Alternative 4: SR 24 to I-80 HOV Bypass
- Alternative 5: Powell Street / I-80 Ramps Intersection - HOV Improvement
- Alternative 6: I-80 HOV Lane Merge - Lane Removal
- Alternative 7: I-80 HOV Lane Merge Lane Extension

Bay Bridge (Western Approach) Improvement Alternatives

- Alternative 8: SR 101 to Bay Bridge HOV Lane
- Alternative 9: US-101 / I-80 to Bay Bridge HOV Lane
- Alternative 10: SR 24 to I-80 HOV Bypass
- Alternative 11: Martin Luther King Jr. Freeway Bus Ramp

San Francisco Bay Crossings Study Update May 2012
Highway Approach Improvement Alternatives
Highway Approach Improvement Alternative Locations

San Mateo Bridge Approach Improvement Alternatives

Dumbarton Bridge Approach Improvement Alternatives
## Highway Approach Improvement Alternatives Ranking

<table>
<thead>
<tr>
<th>Rank</th>
<th>#</th>
<th>Alternative</th>
<th>Cost (FY2011$)</th>
<th>Time Savings Benefit</th>
<th>Cost / Benefit Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5</td>
<td>Powell Street / I-80 Ramps Intersection - HOV Improvement</td>
<td>$1,200,000</td>
<td>$6,470,000</td>
<td>5.18</td>
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<tr>
<td>2</td>
<td>15</td>
<td>San Mateo Bridge Open Road Tolling</td>
<td>$4,200,000</td>
<td>$10,150,000</td>
<td>2.42</td>
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<tr>
<td>3</td>
<td>16</td>
<td>Dumbarton Bridge Open Road Tolling</td>
<td>$3,800,000</td>
<td>$8,530,000</td>
<td>2.24</td>
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<tr>
<td>4</td>
<td>2</td>
<td>MacArthur Boulevard Bus Ramp</td>
<td>$11,100,000</td>
<td>$13,340,000</td>
<td>1.20</td>
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<td>5</td>
<td>8</td>
<td>Fourth Street On-Ramp / Ninth Street Off-Ramp Braid</td>
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<td>$16,550,000</td>
<td>0.33</td>
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<tr>
<td>6</td>
<td>1</td>
<td>Mandela Parkway Bus Ramp</td>
<td>$46,200,000</td>
<td>$11,130,000</td>
<td>0.24</td>
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<tr>
<td>7</td>
<td>11</td>
<td>Cesar Chavez to US 101 HOV Lane Addition</td>
<td>$35,900,000</td>
<td>$7,530,000</td>
<td>0.21</td>
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<tr>
<td>8</td>
<td>10</td>
<td>US 101 to Cesar Chavez Street HOV Lane Addition</td>
<td>$70,200,000</td>
<td>$12,580,000</td>
<td>0.18</td>
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<td>Bay Bridge to US 101 Lane Addition</td>
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<td>$20,730,000</td>
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<td>14</td>
<td>I-280 (US 101 to Bay Bridge) HOV Lane Addition / Bypass</td>
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<td>$24,430,000</td>
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<td>11</td>
<td>13</td>
<td>US 101 (I-280 to Bay Bridge) HOV Lane Addition / Bypass</td>
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<td>$41,070,000</td>
<td>0.12</td>
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<tr>
<td>12</td>
<td>19</td>
<td>Newark Boulevard Westbound HOV Ramps</td>
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<td>0.07</td>
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<td>12</td>
<td>Fifth Street On-Ramp HOV Lane Addition</td>
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<td>14</td>
<td>18</td>
<td>SR 84 FasTrak Lane Extension</td>
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<td>$1,660,000</td>
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<tr>
<td>15</td>
<td>4</td>
<td>SR 24 to I-80 HOV Bypass</td>
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<td>17</td>
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<td>$1,560,000</td>
<td>0.01</td>
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<td>3</td>
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<td>0.01</td>
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<td>6</td>
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<td>NA</td>
<td>NA</td>
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<tr>
<td>19</td>
<td>7</td>
<td>I-880 HOV Lane Merge - Lane Extension</td>
<td>$117,000</td>
<td>NA</td>
<td>NA</td>
</tr>
</tbody>
</table>

**Notes:**
- **Bold** indicates alternative is recommended for further study

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Highway Approach Improvement Alternatives

Recommended Alternatives
Highway Approach Improvement Alternatives

Alternative 2: MacArthur Boulevard Bus Ramp (Recommended)

- Cost (FY2011$): $11,100,000
- Time Savings Benefit: $13,340,000
- Benefit / Cost Ratio: 1.20, Rank #4
Highway Approach Improvement Alternatives
Alternative 5: Powell Street / I-80 Ramps Intersection - HOV Improvement (Recommended)

- Cost (FY2011$): $1,248,000
- Time Savings Benefit: $6,468,000
- Benefit / Cost Ratio: 5.18, Rank #1
Highway Approach Improvement Alternatives

Alternative 15: San Mateo Bridge Open Road Tolling (Recommended)

- Cost (FY2011$): $4,200,000
- Time Savings Benefit: $10,150,000
- Benefit / Cost Ratio: 2.42, Rank #2
Highway Approach Improvement Alternatives
Alternative 16: Dumbarton Bridge Open Road Tolling (Recommended)

- Cost (FY2011$): $3,800,000
- Time Savings Benefit: $8,530,000
- Benefit / Cost Ratio: 2.24, Rank #3
Next Steps
Next Steps

• Further study and evaluation of the recommended highway approach improvements

• Bus concepts should be further developed and evaluated as Transit Sustainability Projects

• Re-evaluation of midbay auto and BART crossings should be conducted when warranted by transbay travel demand

• Recommended BART approach improvements should be added to RM3 project list

• Recommended highway approach improvements should be considered as part of any future toll increase expenditure plan
Thank You
Appendix
## Alternatives Update

**New Multimodal Bridge / Tunnel – SR 238 to I-380 (FY2011$)**

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Net Midbay Bridge</th>
<th>Gross Midbay Bridge</th>
<th>Gross 4 SF Bay Bridges</th>
<th>Gross 8 BATA Bridges</th>
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<tr>
<td><strong>Vehicle Traffic</strong></td>
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<td>(Weekday Daily)</td>
<td>+27,100</td>
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<td>+553,400</td>
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<td></td>
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<tr>
<td>(Including Existing Tolls)</td>
<td>$155</td>
<td>$70</td>
<td>$13</td>
<td>$10</td>
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</tbody>
</table>
Alternatives Update
New Multimodal Bridge / Tunnel – SR 238 to I-380
Land Use Sensitivity Test

• Modeling based on Updated ABAG Projections (Proj 011):
  – 2005 vs. 2035 Bay Area Population = +1,970,000 (+28%)
  – 2005 vs. 2035 Bay Area Employment = +951,000 (+28%)
  – 2005 vs. 2035 Daily Vehicle Bay Crossings = +100,000 (+23%)

• If “Initial Vision” demographics were assumed instead:
  – Additional Bay Area Population = +364,000 (+4%)
  – Additional Bay Area Employment = +94,000 (+2%)
  – Additional Daily Vehicle Bay Crossings = +16,400 (+4%)
  – Would reduce estimated toll rates by 4%
Highway Approach Improvement Alternatives

- 19 Highway Approach Improvement Alternatives were identified for the bridge approaches including:
  - Bay Bridge (Eastern Approach)
  - Bay Bridge (Western Approach)
  - San Mateo Bridge Approach
  - Dumbarton Bridge Approach
Highway Approach Improvement Alternatives

• Bay Bridge (Eastern Approach) Alternatives Include:
Bay Bridge (Eastern) Approach Improvement Alternatives

Alternative 1: Mandela Parkway Bus Ramp

- Cost (FY2011$): $46,200,000
- Time Savings Benefit: $11,130,000
- Benefit / Cost Ratio: 0.24, Rank #6
Bay Bridge (Eastern) Approach Improvement Alternatives
Alternative 2: MacArthur Boulevard Bus Ramp

- Cost (FY2011$): $11,100,000
- Time Savings Benefit: $13,340,000
- Benefit / Cost Ratio: 1.20, Rank #4
Bay Bridge (Eastern) Approach Improvement Alternatives

Alternative 3: Maritime Street HOV Lane Addition

- Cost (FY2011$): $19,600,000
- Time Savings Benefit: $144,000
- Benefit / Cost Ratio: 0.01, Rank #17
Bay Bridge (Eastern) Approach Improvement Alternatives
Alternative 4: SR 24 to I-80 HOV Bypass

- Cost (FY2011$): $439,400,000
- Time Savings Benefit: $9,498,000
- Benefit / Cost Ratio: 0.02, Rank #15
Bay Bridge (Eastern) Approach Improvement Alternatives

Alternative 5: Powell Street / I-80 Ramps Intersection - HOV Improvement

• Cost (FY2011$): $1,248,000
• Time Savings Benefit: $6,468,000
• Benefit / Cost Ratio: 5.18, Rank #1
Bay Bridge (Eastern) Approach Improvement Alternatives
Alternative 6: I-880 HOV Lane Merge – Lane Removal

• Cost (FY2011$): $114,000
• Time Savings Benefit: NA
• Benefit / Cost Ratio: NA, Rank #18
Bay Bridge (Eastern) Approach Improvement Alternatives
Alternative 7: I-880 HOV Lane Merge – Lane Extension

• Cost (FY2011$): $117,000
• Time Savings Benefit: NA
• Benefit / Cost Ratio: NA, Rank #19
Highway Approach Improvement Alternatives

- Bay Bridge (Western Approach) Includes:
Bay Bridge (Western) Approach Improvement Alternatives

Alternative 8: Fourth Street On-Ramp / Ninth Street Off-Ramp Braid

- Cost (FY2011$): $50,000,000
- Time Savings Benefit: $16,550,000
- Benefit / Cost Ratio: 0.33, Rank #5
Bay Bridge (Western) Approach Improvement Alternatives

Alternative 9: Bay Bridge to US 101 Lane Addition

- Cost (FY2011$): $134,900,000
- Time Savings Benefit: $20,730,000
- Benefit / Cost Ratio: 0.15, Rank #9
Bay Bridge (Western) Approach Improvement Alternatives  
Alternative 10: US 101 to Cesar Chavez Street HOV Lane Addition  

- Cost (FY2011$): $70,200,000  
- Time Savings Benefit: $12,580,000  
- Benefit / Cost Ratio: 0.18, Rank #8
Bay Bridge (Western) Approach Improvement Alternatives

Alternative 11: Cesar Chavez Street to US 101 HOV Lane Addition

- Cost (FY2011$): $35,900,000
- Time Savings Benefit: $7,530,000
- Benefit / Cost Ratio: 0.21, Rank #7
Bay Bridge (Western) Approach Improvement Alternatives

Alternative 12: Fifth Street On-Ramp HOV Lane Addition

- Cost (FY2011$): $4,300,000
- Time Savings Benefit: $220,000
- Benefit / Cost Ratio: 0.05, Rank #13
Bay Bridge (Western) Approach Improvement Alternatives
Alternative 13: US 101 (I-280 to Bay Bridge) HOV Lane Addition / Bypass

- Cost (FY2011$): $329,500,000
- Time Savings Benefit: $41,070,000
- Benefit / Cost Ratio: 0.12, Rank #11
Bay Bridge (Western) Approach Improvement Alternatives
Alternative 14: I-280 (US 101 to Bay Bridge) HOV Lane Addition / Bypass

- Cost (FY2011$): $171,300,000
- Time Savings Benefit: $224,430,000
- Benefit / Cost Ratio: 0.14, Rank #10

$: $171,300,000
Benefit: $224,430,000
Ratio: 0.14, Rank #10
Highway Approach Improvement Alternatives

• San Mateo Bridge Approach Includes:
San Mateo Bridge Approach Improvement Alternatives

Alternative 15: San Mateo Bridge Open Road Tolling

- Cost (FY2011$): $4,200,000
- Time Savings Benefit: $10,150,000
- Benefit / Cost Ratio: 2.42, Rank #2
Highway Approach Improvement Alternatives

• Dumbarton Bridge Approach Includes:

Alternative 16
Dumbarton Bridge
Open Road Tolling

Alternative 17
Western SR 84 / Northern I-880
HOV Connectors

Alternative 18
SR 84 FasTrak
Lane Extension

Alternative 19
Newark Boulevard
Westbound
HOV Ramps
Dumbarton Bridge Approach Improvement Alternatives

Alternative 16: Dumbarton Bridge Open Road Tolling

- Cost (FY2011$): $3,800,000
- Time Savings Benefit: $8,530,000
- Benefit / Cost Ratio: 2.24, Rank #3
Dumbarton Bridge Approach Improvement Alternatives
Alternative 17: Western SR 84 / Northern I-880 HOV Connectors

• Cost (FY2011$): $104,000,000
• Time Savings Benefit: $1,560,000
• Benefit / Cost Ratio: 0.02, Rank 16
Dumbarton Bridge Approach Improvement Alternatives

Alternative 18: SR 84 FasTrak Lane Extension

- Cost (FY2011$): $33,500,000
- Time Savings Benefit: $1,660,000
- Benefit / Cost Ratio: 0.05, Rank #14
Dumbarton Bridge Approach Improvement Alternatives

Alternative 19: Newark Boulevard Westbound HOV Ramps

- Cost (FY2011$): $24,400,000
- Time Savings Benefit: $1,800,000
- Benefit / Cost Ratio: 0.07, Rank #12