ALAMEDA
County Transportation
Commission

SB I-680 Express Lane Evaluation Studies

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TRANSPORTATION ENGINEERING/PLANNING

A Presentation to

TRB National Transportation Planning Applications Conference

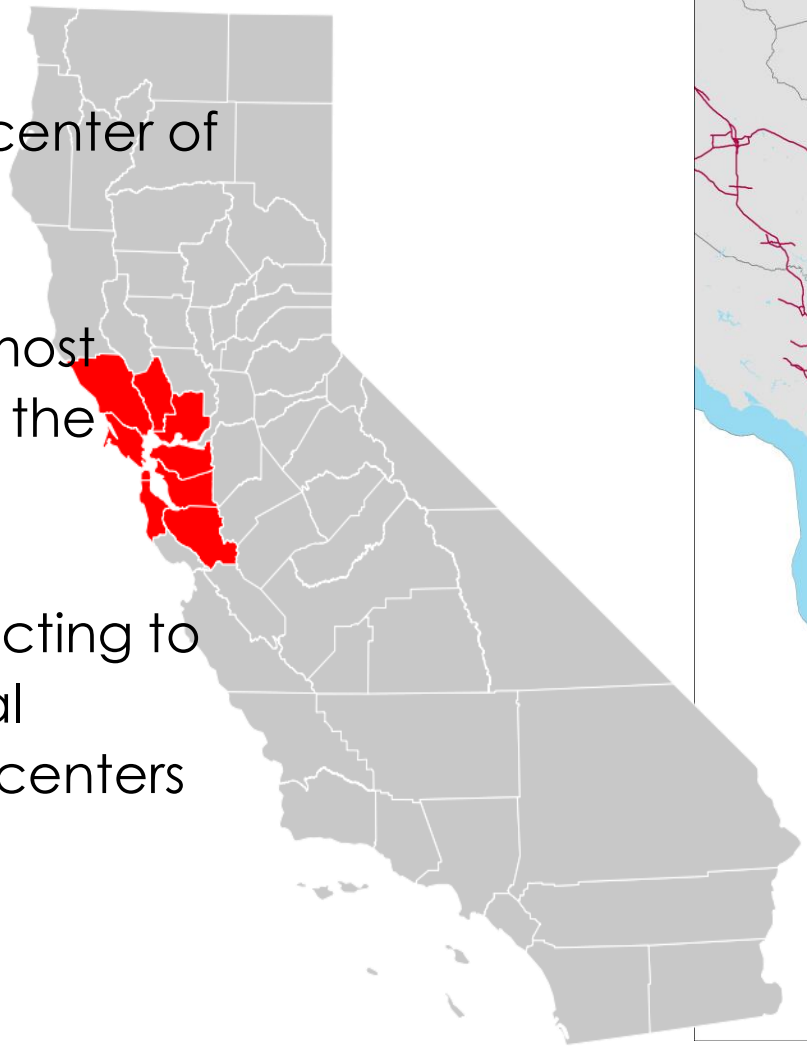
May 19, 2015

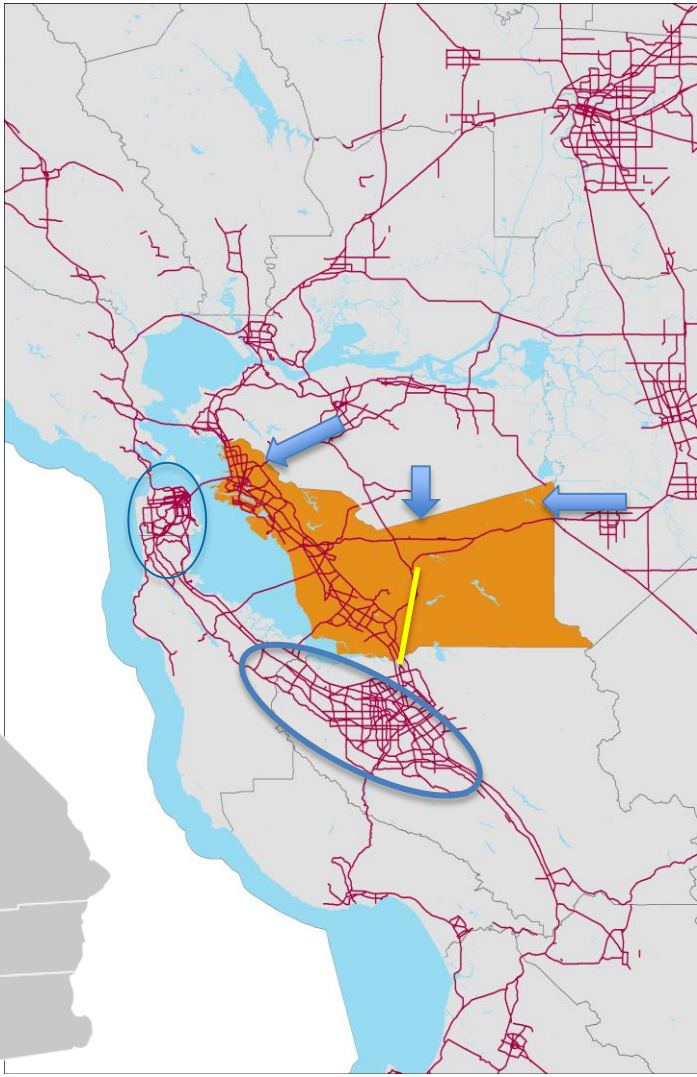
Presentation Overview

- Background –Alameda County and I-680 Express Lane
- Evaluation Study Process
- Performance Measures
- Data Collection
- Highlights of Results
- Meeting Express Lane Objectives
- Recommendations

Alameda County

- Geographic center of the Bay Area
- Experiences most congestion in the region
- I-680 – Connecting to major regional employment centers





Southbound I-680 Express Lane Background

- First Express Lane in the Bay Area (AB 2032)
- 14 mile long traversing two counties
- Key connection to the Silicon Valley employment and the central valley and east Alameda County
- Opened in Sep 2010

Express Lane Evaluation Studies - Background

- Legislative Requirement (AB 2032)
  - Evaluation report submission required to the Legislature within 3 years of Express Lane opening
- Evaluation Report due to legislature before Sep 2013
- "Before" Study was completed in 2009 – A Control Corridor was also studied
- "After" Study was completed in June 2013

Express Lane Evaluation Studies - Process

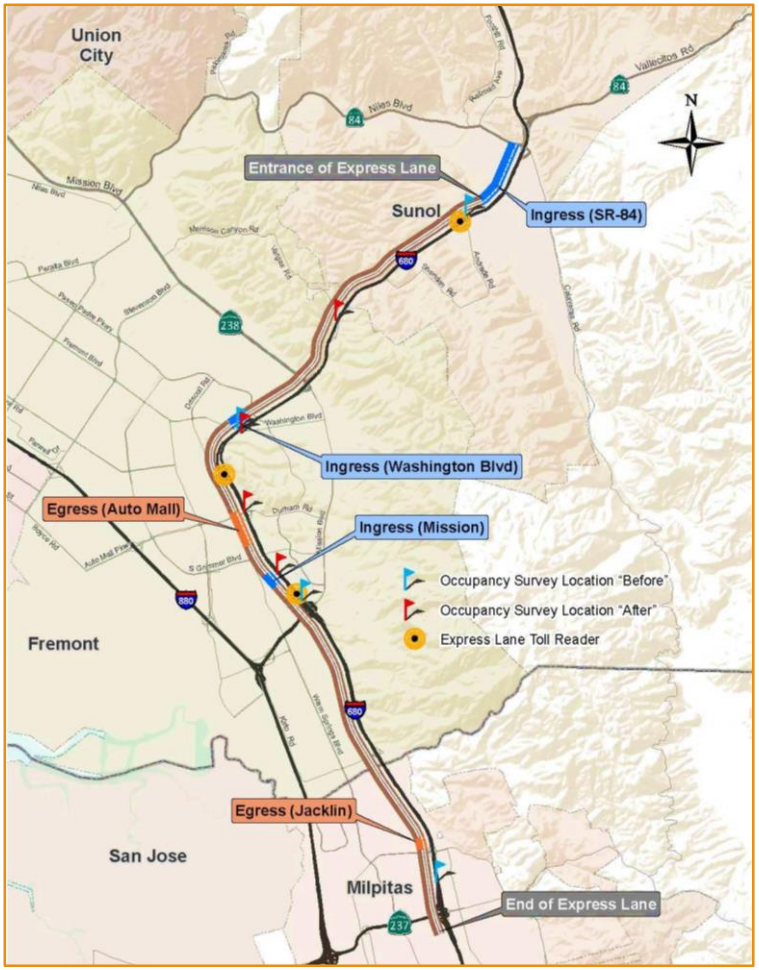
- Data Collection and Analysis consistent for both "Before" and "After" Studies for Evaluation
- Study development was also informed by
  - Discussion with the stakeholders
    - Caltrans, CHP, MTC and VTA
  - Comments from local jurisdictions
    - Alameda County, Cities of Pleasanton and Fremont

Evaluation Studies - Performance Measures

- Travel Time
- Travel Speeds
- Vehicle and Person Throughput
- Vehicle Occupancy
- Bottlenecks and Queues
- Level of Service
- Transit Ridership
- Safety
- HOV/Express Lane Violations and Enforcement

Evaluation Studies - Data Collection

- Traffic counts
- Travel time surveys
- Manual vehicle occupancy survey
  - Study corridor – 4 locations
  - Control corridor – 2 locations
- Aerial photography
- Video recordings 4 locations
- Existing data sources
  - Toll detector and toll revenue records, transit ridership, collision reports, citation



Evaluation Studies - Data Analysis Periods

- Comparison between "Before" and "After" conditions
  - Three distinct time periods
    - AM peak period (5AM – 9 AM)
    - PM peak period (3 PM – 7 PM)
    - Daytime period (7 AM - 7 PM)
  - Peak Periods generally consistent with the HOV operations hours in the "Before" condition
  - **Focused Analysis for AM Peak Period – the peak commute direction**

Evaluation Results - Highlights

Performance Measure	Evaluation Results	Time Period	Change from "Before" to "After"
Strong Positive Partially Positive	Mix of Positive and Negative		Partially Negative Strong Negative
TRAVEL TIMES			
Express Lane		AM peak average	-0.5 minutes (-4%)
Express Lane		PM peak average	-0.2 minutes (-2%)
General purpose lanes		AM peak average	-2 minutes (-13%)
General purpose lanes		PM peak average	-0.2 minutes (-2%)
TRAVEL SPEEDS			
Express Lane		AM peak average	+3 mph
Express Lane		PM peak average	+1 mph
General purpose lanes		AM peak average	+6 mph
General purpose lanes		PM peak average	+2 mph
THROUGHPUT			
Vehicle throughput		AM peak period	+1% to +11%
Vehicle throughput		PM peak period	+1% to +38% at 3 north locations -13% at the southern location
Person throughput		AM peak period	-2% to +2%
Person throughput		PM peak period	+1% to +38% at 3 locations, -17% at 1 location

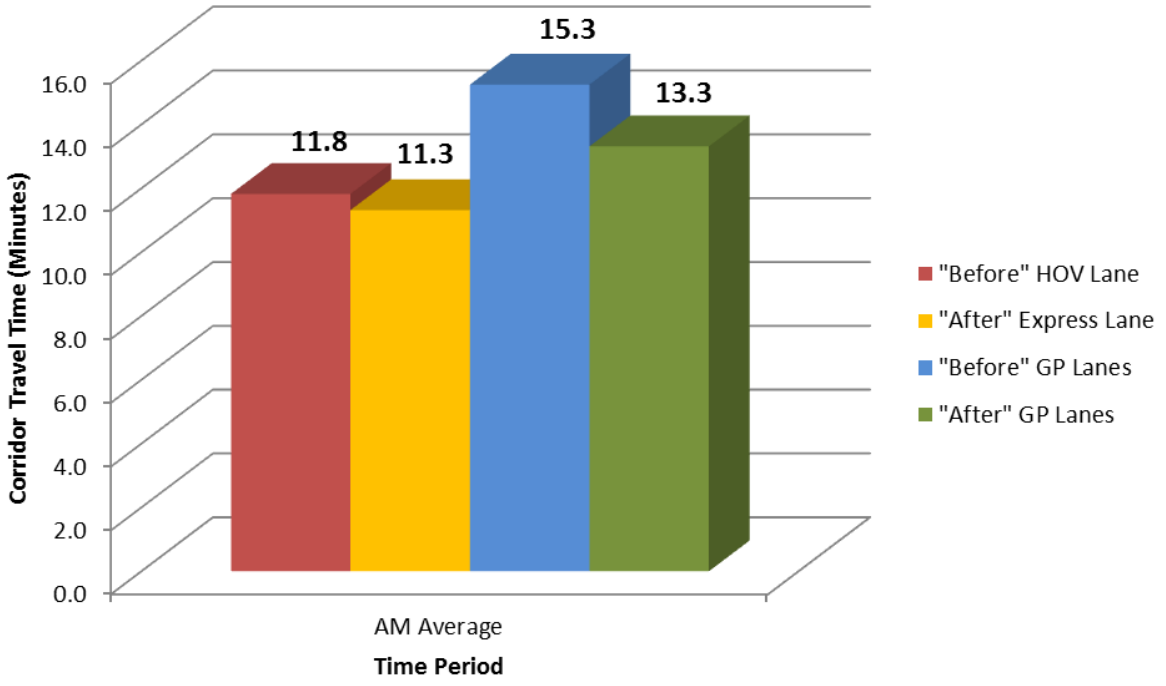
Evaluation Results - Highlights

Performance Measure	Evaluation Results	Time Period	Change from "Before" to "After"
BOTTLENECKS AND QUEUES			
Number of bottlenecks		AM peak period	Existing two bottlenecks at the southern section remain new bottleneck added at SR 84
Length of queues		AM peak period	Max. queue reduced from 7.4 to 2.9 miles
VEHICLE OCCUPANCY			
HOV percent (all lanes)		AM peak period	-32%
HOV percent (all lanes)		PM peak period	-7%
LEVEL OF SERVICE			
Express Lane		AM and PM peak periods	Remains LOS A or B
General purpose lanes		AM peak period	4 segments in middle of corridor improve from LOS F, 1 in north and 1 in south become LOS F
General purpose lanes		PM peak period	Increased density. Although LOS changed from B to C in many segments, all segments remain LOS C
TRANSIT RIDERSHIP			
Daily transit passengers on lines serving corridor		Daily	-6% (Lines reduced from 10 to 6)
SAFETY			
Collision rate		Annual	-50%
VIOLATIONS AND ENFORCEMENT			
Toll violations		AM peak period	20% of SOVs or 11% of all vehicles in the Express Lane
Illegal crossing of double white line		AM peak period	<1%
Illegal egress at Washington ingress		AM peak period	6%
Number of citations		Annual	205 in 2009, 478 in 2011 223 in 2012

Travel Time Results

The Express Lane significantly improved the travel times on the general purpose lanes. Travel times on the Express Lane also improved despite the addition of solo toll paying vehicles to this lane.

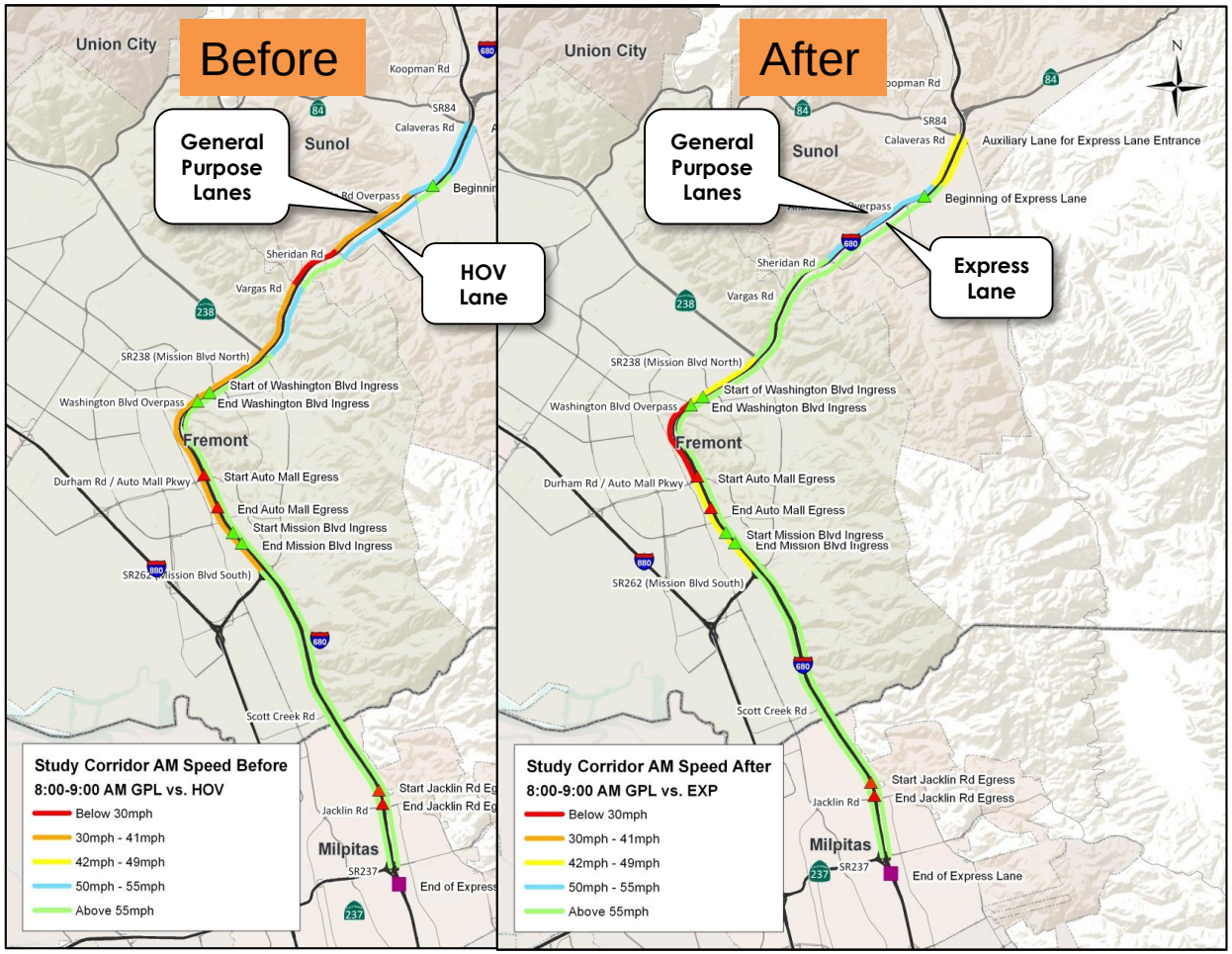
- Average AM peak travel time reduced
  - Express Lane – 0.5 minute (4%)
  - General purpose lanes – 2 min (13%)



Travel Speed Results

The Express Lane improved speeds in both General Purpose and Express Lanes

- General purpose lanes AM peak average speeds increased by 6 mph
- Express Lane AM peak speeds increased by 3 mph
- **Maximum AM peak increase was 11 mph in the general purpose lanes** and 6 mph in the Express Lane



Vehicle and Person Throughput Results

Overall, the Express Lane increased corridor vehicle and person throughput

- Vehicle throughput increased in all locations during AM peak and three locations during PM peak and daytime periods
- Decreases at one location at the southern end of corridor at SR 237/Calaveras Blvd during the PM peak (17%) and daytime periods (12%)
  - The completed I-880/Mission interchange that provides improved access to Santa Clara County through I-880 in combination with the implementation of the Express Lane has contributed to decreases in throughput on I-680 at the south end of the corridor
- Person throughput shows modest decline to modest improvements for the AM peak and follows the trend for the PM peak and all day periods.

Vehicle Occupancy Results

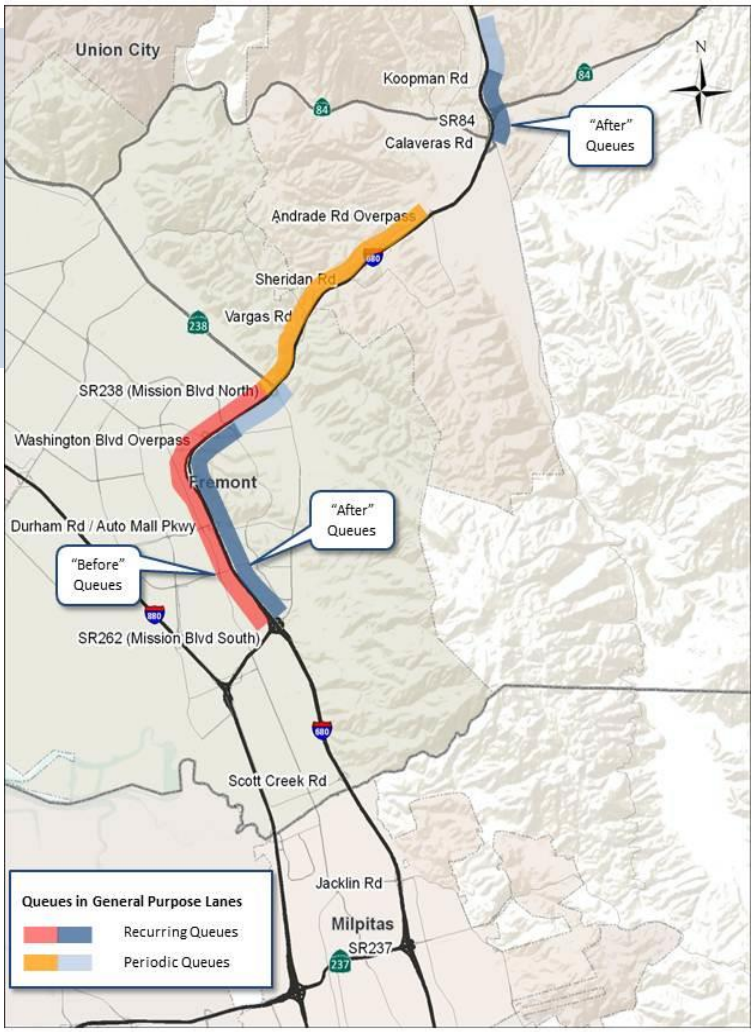
Vehicle Occupancy in the corridor declined likely due to a combination of factors - general decline in carpooling regionwide, changes in employment due to the recession contributing to changes in modal preferences, and improvements in travel time in the general purpose lanes.

- In Express Lane, single-occupant vehicles increased from 27-35% "Before" to 54-61% "After"
- The "After" study showed a decrease in HOV usage in all lanes combined
  - Average HOV percentage decreased by 32% in AM peak and 7% in PM peak
  - Control Corridor HOV percentage also decreased comparably

Bottlenecks and Queues Results

Queues in the general purpose lanes during AM peak decreased from 7.4 miles to 2.9 miles. New queue found at SR 84 due to vehicles weaving to enter the Express Lane

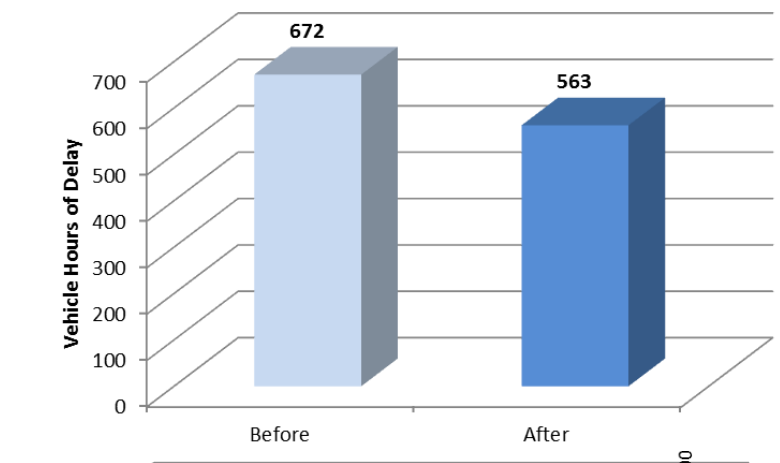
- Two bottlenecks remain from "Before" conditions:
  - Off-ramp to Auto Mall/Durham
  - Off-ramp to SR 262/Mission

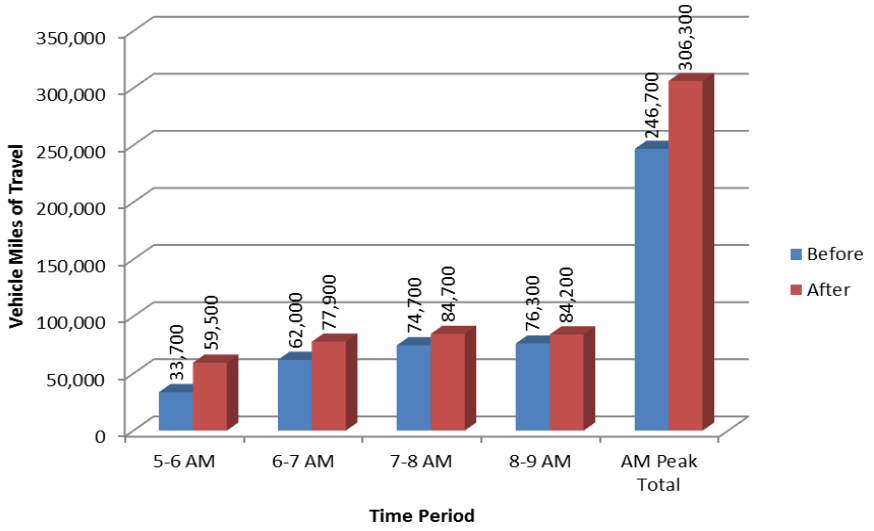


Level of Service and Other Measures Results

Overall LOS improved or stayed the same. Vehicle Hours of Delay reduced and Vehicle Miles Traveled increased.

- Express Lane level of service remained at LOS A or B, above the required LOS C
- General purpose lanes LOS improved in the middle of corridor, with LOS F at north end and approaching SR 262/Mission – consistent with bottleneck and queue locations
- Other Measures for AM peak-
  - VHD decreased by 16%
  - VMT increased by 24%





Transit Ridership Results

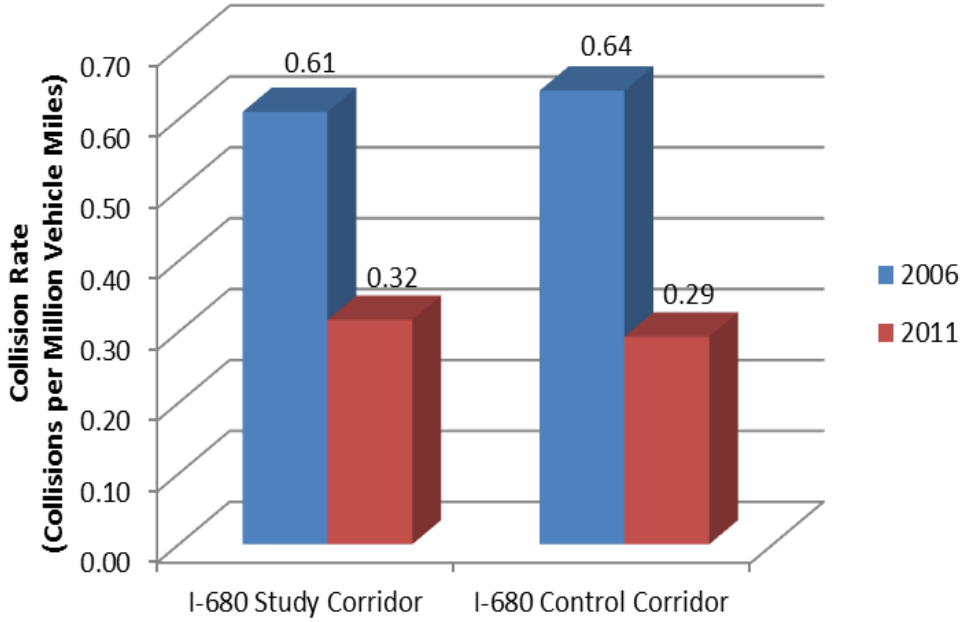
The decreases in transit ridership experienced were related to the transit service reductions, part of a larger regional trend, and are not related to the implementation of the Express Lane.

- Average weekday ridership on transit lines using the Express Lane corridor decreased by 6%, and the control corridor decreased by 5%.
- Service reductions of approximately 50% was experienced in both corridors.

Safety Results

Express Lane did not contribute to any increases in collision rates.

- Average collision rates decreased by 50% from 2008 to 2011 in both study and control corridors



Analysis and Results: Violations and Enforcement

The maximum toll violation rate was 20% of SOVs in the Express Lane. Access violation at Washington Boulevard ingress was estimated as 6%.

- The maximum toll violation rate (single-occupant vehicles not paying a toll) was 11% of all vehicles or 20% of SOVs in the Express Lane
- The rate of illegal crossings of the double white line was less than 1%
- A minimum violation rate of 6% was estimated for vehicles using the Washington Blvd. ingress as an egress location
- Express Lane enforcement has resulted in reduced citations

Other Factors Affecting Study Corridor

Employment levels are comparable between 2008 and 2012 but fluctuated significantly in between

The significant changes in employment in the years between 2008 and 2012 likely created some changes in types of employment and modal preferences

Implementation of ramp metering in 2011slightly increased the corridor volumes and travel times

Despite the increase in volume and travel time, the Express Lane and general purpose lanes showed improvement

Other Factors Affecting Study Corridor

I-880/Mission interchange was completed in 2009 after the "Before" Study

The improved interchange in combination with the implementation of the Express Lane has contributed to decreases in throughput volumes on I-680 at the south end of the corridor

The percentage of commuters using carpools declined by 0.3% in Alameda County and nearly 2% in Contra Costa County between 2008 and 2011

Decreases in corridor vehicle occupancy are likely affected by the overall larger declining trend in carpool trips

Express Lane Evaluation Studies: Meeting Legislative Objectives

1. **Objective:** Optimize the HOV lane usage to improve traffic throughput in the corridor.

   Results: Overall vehicle and person throughput in the corridor increased, average travel times decreased by 2 minutes (13 percent) in the general purpose lanes and 1 minute (4%) in the Express Lane, and average speeds increased by 6 mph in the general purpose lanes and 3 mph in the Express Lane.

2. **Objective:** Maintain LOS C or better for all Express Lane users.

   Results: Express Lane LOS levels did not go below LOS B.

Express Lane Evaluation Studies: Meeting Legislative Objectives

3. **Objective:** Use net revenue to improve highway and transit in the corridor.

   Results: Currently all toll revenues are being used towards the Express Lane operations. When net revenue becomes available over and above covering the Express Lane operations, it will be used to improve highway and transit in the corridor.

4. **Objective:** Employ new intelligent transportation system (ITS) technologies.

   Results: Dynamic pricing is currently being deployed to optimize the throughput. Working with the regional partners, technology options for other purposes are being explored including switchable toll tags and automated license plate reading for enforcement purposes.

Express Lane Evaluation Studies: Recommendations

- Based on "After" Study findings, some improvements can be implemented to further improve the corridor performance in terms of occupancy (carpool use), transit ridership, level of service and related bottlenecks, and toll violations
  - Increase HOV usage and transit ridership for trips within Alameda County
    - Focused implementation of a TDM program that includes tools to promote use of alternate modes
  - Reduce toll violation rates
    - Implementation of new technologies such as automated license plate reading combined with switchable toll tag capabilities

Express Lane "After" Study: Recommendations

- Conduct studies to Identify potential options to improve operations
  - at the new congested conditions at SR 84
  - at the two existing bottlenecks in the southern portion of the Express Lane at the Auto Mall Parkway/Durham Road and SR 262/Mission Boulevard interchanges
  - to address the Express Lane access issues experienced at the Washington Boulevard and Auto Mall Parkway/Durham Road interchanges

For information on the Evaluation Studies - Contact

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Questions?