Agenda Item 3

BAIFA
BAY AREA INFRASTRUCTURE FINANCING AUTHORITY

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Memorandum

TO: BAIFA DATE: May 10, 2013

FR: Executive Director W. I. 1236

RE: Concept of Operations for BAIFA Express Lane Program

Staff requests the Authority approve the key operating features of BAIFA's 270-mile Express Lane Program:

- An open access lane configuration, with occasional restrictions based on safety and operations analysis, coupled with zone-based tolling and dynamic pricing;
- Automated toll enforcement with switchable toll tags and license plate recognition; and
- Customer service provided by FasTrak®.

These features are detailed in a Concept of Operations document which is an important precursor for the system integrator procurement. Staff plans to release this procurement in Fall 2013.

Background

When a public agency develops a new intelligent transportation system, one of the first tasks the agency must complete is development of a Concept of Operations document. The document defines the project sponsor's vision of how the system will work from various stakeholders' perspectives: the customer, the operators, and other partners, such as the California Highway Patrol (CHP). In the case of express lanes, the Concept of Operations informs the civil design of the facility such as lane configuration and CHP observation zones, and serves as the basis for developing the technical requirements that are used to design, develop and deliver the toll system. The toll system consists of central computing systems, software, toll readers, license plate cameras, and other field equipment needed to calculate the toll and send it to the FasTrak® Regional Customer Service Center for posting to customer accounts.

Staff developed the Concept of Operations for BAIFA's Express Lane Program in cooperation with a technical staff from partner agencies[1]. Staff consulted with local transit agencies and conducted research regarding lane configuration, signage, pricing and lane enforcement. Alameda County Transportation Commission (ACTC) and Santa Clara Valley Transit Authority (VTA) staff participated in the development to promote consistency among express lanes. Lastly, staff gauged trends in express lane deployments in California and other parts of the country.

[1] Includes staff from Alameda County Transportation Commission (ACTC), Contra Costa Transportation Authority (CCTA), Solano Transportation Authority (STA), Valley Transportation Authority (VTA), Caltrans and CHP.

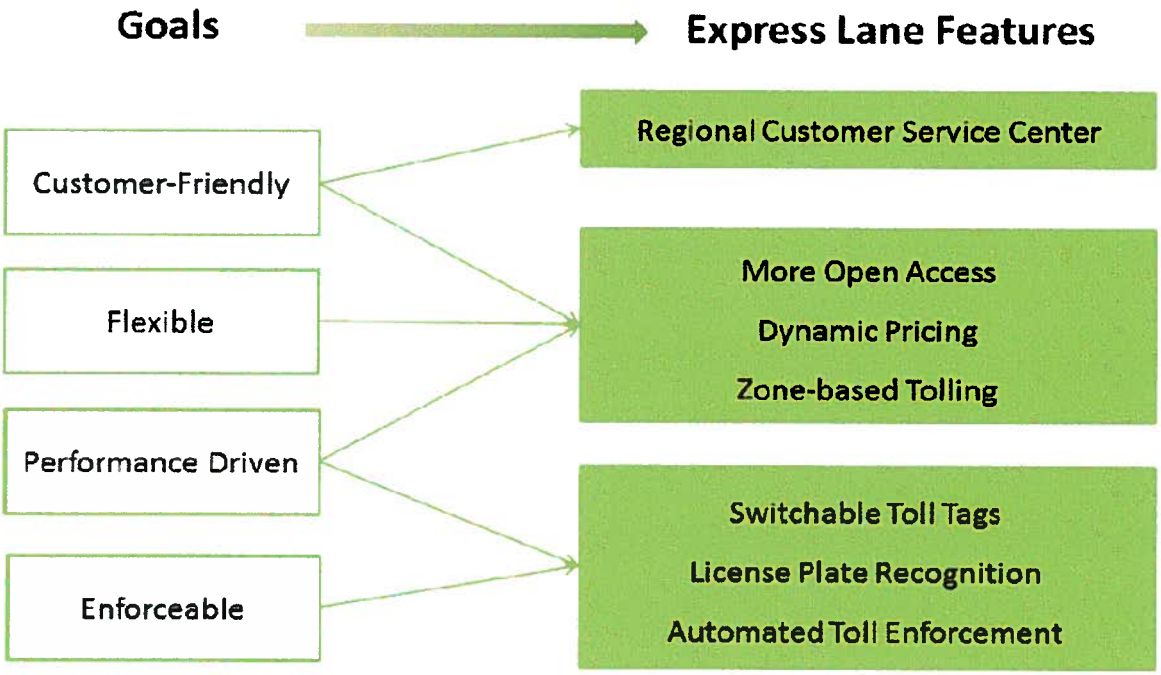
Many of the key operating features proposed for BAIFA's Express Lane Program are different from how the region's existing express lanes on I-680 and SR-237 currently operate and reflect lessons learned. However, other agencies are interested in BAIFA's Express Lane Program's Concept of Operations. For example, the ACTC Board is already considering implementing a similar operating concept as the Authority's for its future express lanes on I-580. VTA staff is also exploring elements of the Authority's concept for potential implementation on SR-85 and US-101. Staff expects both boards will eventually consider how to address the legacy operations on the Alameda I-680 and the VTA SR-237 express lane operations.

Goals and Key Operating Features

In order to develop BAIFA's Express Lane Program, staff identified a series of goals to help define key operating features:

- **Customer-Friendly** - Maximize access to the lanes, build on existing toll infrastructure and coordinate with neighboring express lane operators;
- **Flexible** - Respond to changes in technology, traffic patterns, toll policy and expansion of express lanes over time;
- **Performance Driven** – Operate the lanes efficiently to preserve existing benefits for HOVs including public transit and to make them an attractive choice for solo drivers when necessary; and
- **Enforceable** – Protect the integrity of the toll system and its revenue stream through sound enforcement practices for operational and financing purposes.

The following graphic shows how these main goals influence key express lane features and narrow the options for how to deliver the lanes. These key features are discussed below and described further in Attachment 1.



More Open Access, Zone-based Tolling and Dynamic Pricing
One key recommended feature is that access to the lanes be more open than restricted. This feature supports a customer-friendly, flexible system. With fewer physical restrictions to access express lanes, customers have more options to use them. The lack of permanent physical barriers allows the lane configuration and toll system to more easily and cost-effectively adapt to changing needs over time.

Zone-based tolling is an important complementary policy to the more open access concept to minimize abuse of the open lane configuration. With zone-based tolling, a customer is charged the full cost to travel in the zone once their toll tag is read by a single reader. Zone-based tolling will discourage customers from weaving in and out of the express lane to avoid toll tag readers because it is likely the toll system will eventually read their toll tag or capture their license plate.

The price for non-HOVs to use the express lane will change over time as congestion on the freeway changes. This is called "dynamic pricing", and it effectively manages demand to meet speed performance thresholds for the express lanes.

Variable toll message signs will display two prices: the price to travel to the end of the current zone and to a major destination in a subsequent zone. Paying customers will be guaranteed the prices on the sign at the time they are first detected in the express lane.

Automated Toll Enforcement, Switchable Toll Tags and License Plate Recognition
Another key recommended feature is that toll enforcement be automated to the extent possible. Toll violators degrade lane performance, and manual enforcement is not always effective. Automated toll enforcement supports express lane performance and minimizes revenue leakage which preserves the overall integrity of the express lane system. To enable more automated toll enforcement, all vehicles in the express lane must have a toll tag. Solo drivers can use existing FasTrak® toll tags to pay to use the lane, but HOVs must use switchable toll tags so that they can declare their HOV status to the toll system and travel for free. By requiring toll tags for all vehicles, the toll system will be able to automatically manage toll violations when no tag read is detected. A camera will capture a license plate image, and if no FasTrak® account is associated with the license plate, a violation notice will be sent to the license plate owner. For occupancy enforcement, CHP will conduct visual assessments of vehicles that declare themselves as HOVs. This approach is generally consistent with how BATA operates the toll collection system on the state-owned bridges. This switchable toll tag system is currently in use is Los Angeles and the Washington, D.C. area.

Regional Customer Service Center
The FasTrak® Customer Service Center will provide customer service including issuing switchable toll tags, managing toll tag accounts, sending statements of account activity,

processing toll payments, issuing toll violation notices and answering customer inquiries. The express lane toll system manager will provide support as needed.

Schedule

The Concept of Operations is an important work product on the critical path of Express Lane Program delivery. Staff would like to finalize the Concept of Operations Report this month. This report serves as the basis for the system requirements which will be included in the System Integrator procurement, scheduled to be released this fall. Delays in defining the operating concept could ultimately affect the Express Lane Program opening dates and cost.

Recommendation

Staff requests the Authority approve the key operating features of BAIFA's Express Lane Program:

- An open access lane configuration, with occasional restrictions based on safety and operations analysis, coupled with zone-based tolling and dynamic pricing;
- Automated toll enforcement with switchable toll tags and license plate recognition; and
- Customer service provided by FasTrak®.

Steve Heminger

SH: PG
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Attachment 1
BAIFA Express Lane Program
Key Operating Features

The key operating features for BAIFA's Express Lane Program are summarized below.

1. **More Open Access, Zone-based Tolling and Dynamic Pricing**

   As is the case with High-Occupancy Vehicle (HOV) lanes today, access between the express lane and the adjacent general purpose lane will generally be unrestricted, separated by white skip striping on the pavement. In some cases, access restrictions – in the form of double solid white lines – will be introduced based on operational and safety analysis. Benefits of this approach include:

   - Customer familiarity given how current HOV lanes work;
   - More opportunities for carpools, transit buses and solo drivers to use the lanes;
   - Easier access for buses
   - Reduces the need for additional rights-of-way; and
   - Easy to change the system layout in the future if needed.

   While express lane access can be restricted or more open, options for BAIFA's Express Lane Program are limited. Many Bay Area freeway corridors have confined rights-of-way and would be costly to widen. In such narrow rights-of-way, physical barriers and/or large scale deployment of pylons to separate the express lane from adjacent general purpose lanes are not an option. Striping the road to indicate where access is restricted versus open is the only option given road geometry. In addition, BAIFA's express lanes will only operate during peak period commute hours. When not in operation, express lanes will function like general purpose lanes.

   There is a history of both open and restricted access HOV facilities in California. Both kinds of lanes have proven track records that can translate to successful express lane deployments. In the Bay Area, it makes sense to build on the legacy of our open access HOV lanes since our potential customer base is already familiar with how they operate. Nationally, other express lane facilities are embracing more open access including Minneapolis (I-35W), Seattle (SR-167) and Utah (I-15).

   The more open access approach requires more frequent toll readers, which increases the cost of the toll system relative to a limited access facility. However, this approach also avoids concentrating the locations at which vehicles can enter and exit the express lane thereby reducing the potential need for costly transition lanes such as those on the existing I-680 express lane.

   Express lane corridors will be split into toll zones of approximately 3 to 5 miles in length:

- Each toll zone will have a price. Prices will be displayed on variable toll message signs. The signs will show the price to travel in the current zone and to the next major destination. Prices will change over time depending on congestion. As traffic increases, prices will increase and vice versa.
- At any given time, the price to travel in the zone will be the same no matter where a customer enters the zone.
- The zone price will be locked-in once the customer's toll tag is read in the zone. The price to the next major destination will also be locked in at that time in the event the customer travels to that destination.

This pricing strategy serves as a virtual weaving restriction to the express lane. Since customers will be charged the full zone toll no matter where they enter the zone, unnecessary movements between the express and the adjacent general purpose lane should be reduced.

2. **Automated Toll Enforcement, Switchable Toll Tags and License Plate Recognition**
A sound enforcement strategy minimizes abuse of the express lane, supports express lane performance and preserves the integrity of the toll system overall. Enforcement on express lanes will be performed in several ways:

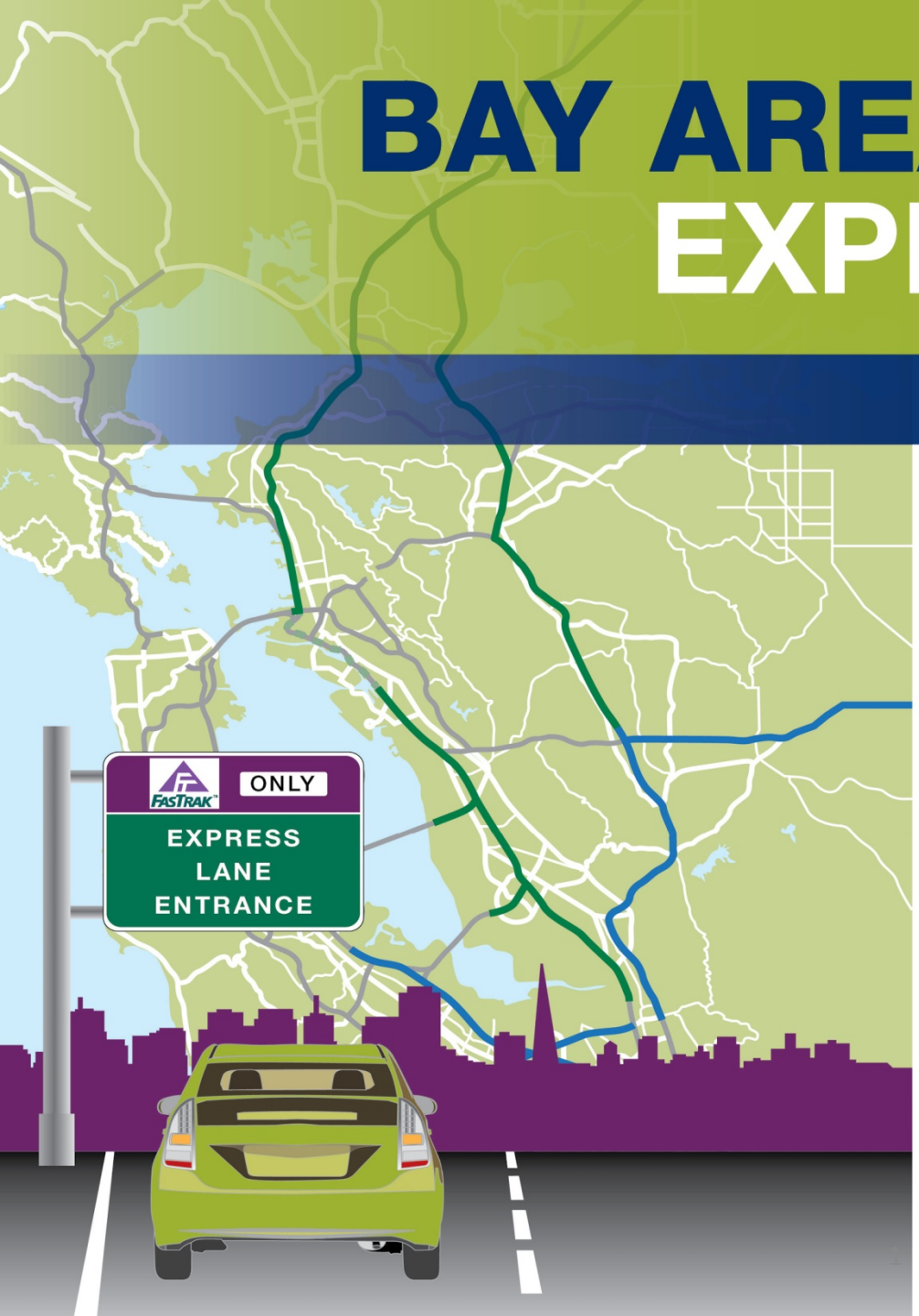
- Similar to the toll bridges, the express lane toll system will have automated *toll violation* enforcement, freeing up CHP to focus on *HOV occupancy* enforcement.
    - To automate toll enforcement, all vehicles in the express lane will be required to have a FasTrak® toll tag. When a vehicle traveling in the lane does not have a toll tag or has a malfunctioning toll tag, a camera will take a picture of the vehicle's license plate. The FasTrak® Customer Service Center will use the license plate to identify the individual for billing or violation notification, depending on business rules. This is an extremely effective approach to manage toll violations, which is necessary to price the lane appropriately and maintain travel speeds.
    - HOVs and other exempt vehicles will still use the express lane for free, but will be required to carry switchable toll tags. A switchable toll tag is like a regular toll tag except that it has a built-in switch that allows a customer to indicate the number of people in the vehicle (1, 2 or 3+). If a vehicle has a regular toll tag, it can still use the express lane, but not as an HOV. Switchable toll tags enable automated toll enforcement because they allow every vehicle in the lane to be classified as either a free or paying vehicle.
    - No technology exists currently to accurately determine vehicle occupancy in an express lane environment. Therefore, CHP will continue to enforce carpool occupancy requirements through manual observation of the express lanes, with assistance from express lanes tools. A beacon will light up each time a self-declared HOV passes under a reader, alerting CHP to visually check the vehicle occupancy. If CHP suspects an HOV violation, CHP will pull the vehicle over to confirm the number of passengers in the vehicle and use a secure web site, accessed through an

on-board computer or by calling CHP dispatch, to confirm the status of the switchable toll tag at the time of the last transaction. If the vehicle is a violator, a record of the last transaction will be provided to CHP to support the citation in a court of law.

3. **Customer Service**

Customer service will be provided by staff at the FasTrak® Customer Service Center (CSC) as is the case for Alameda County Express Lanes and Silicon Valley Express Lanes. The CSC will be responsible for issuing switchable toll tags, managing toll tag accounts, sending statements documenting express lane trips and related tolls, processing toll payments, issuing toll violation notices and responding to customer questions. Beyond these types of basic issues, if the CSC cannot respond to a specific customer service issue, it will escalate the issue to the toll system manager for resolution. ACTC and VTA currently support these types of escalated customer service issues.

BAY AREA EXPRESS LANES



May 22, 2013

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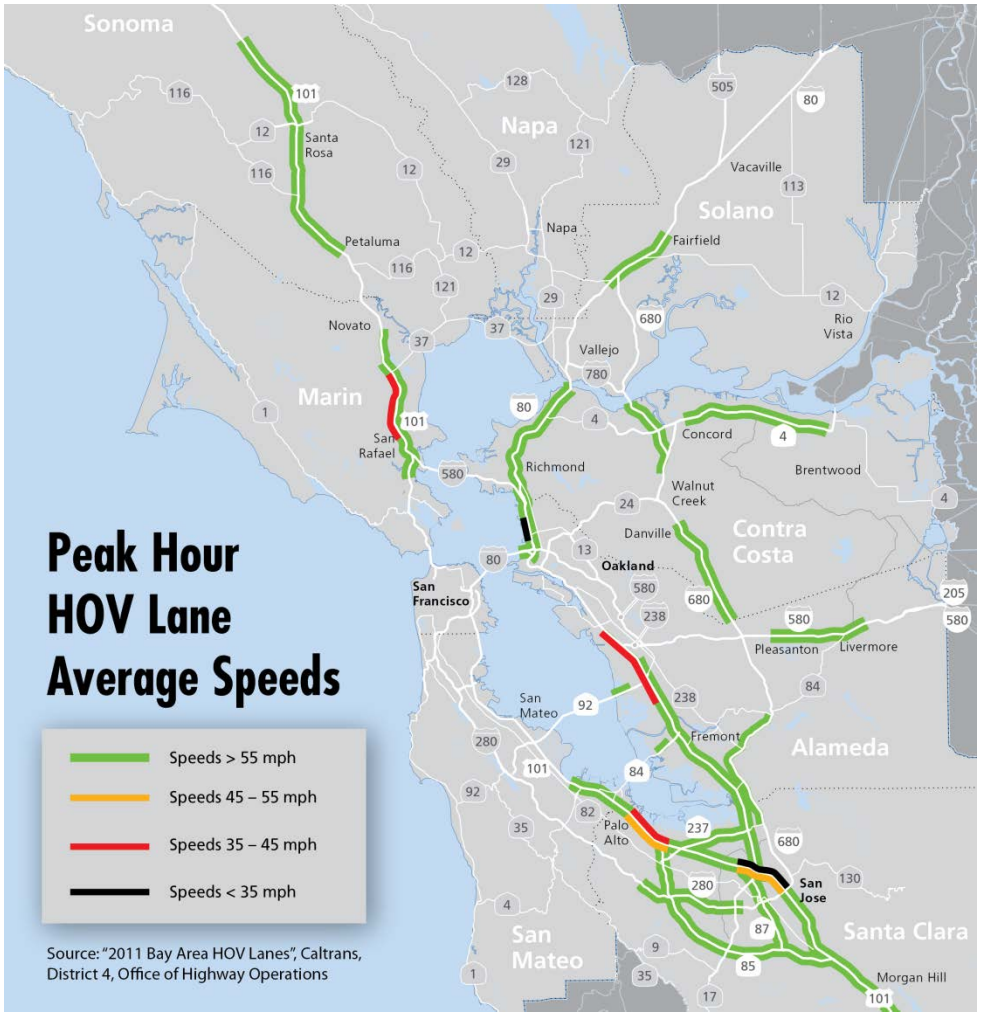
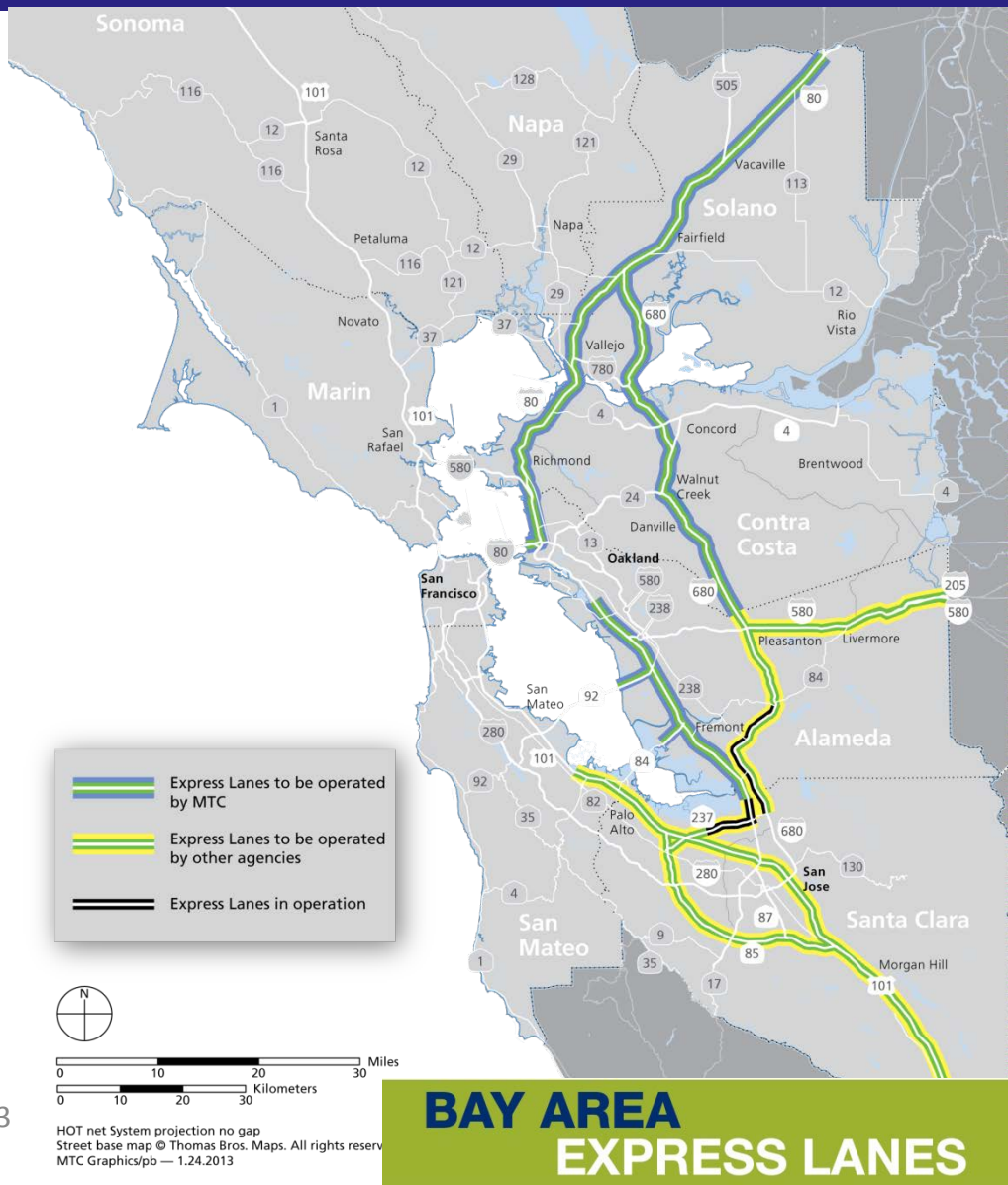
Bay Area Experience



BAY AREA EXPRESS LANES

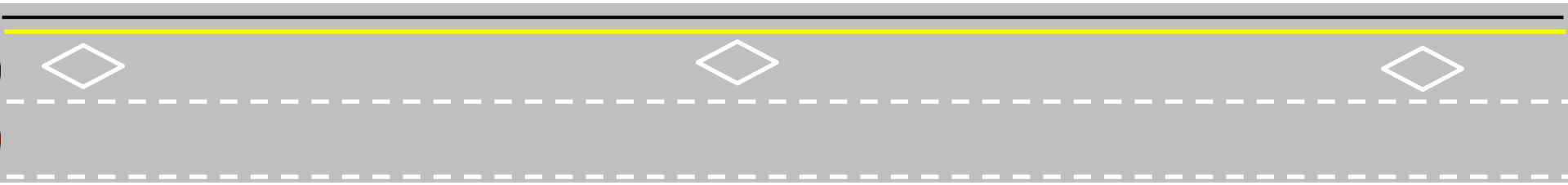
Bay Area Express Lane Network

- 550 miles
  - MTC eligibility to operate 270 miles granted by CTC in Oct 2011.
  - 280 miles in Alameda and Santa Clara Counties authorized in statute

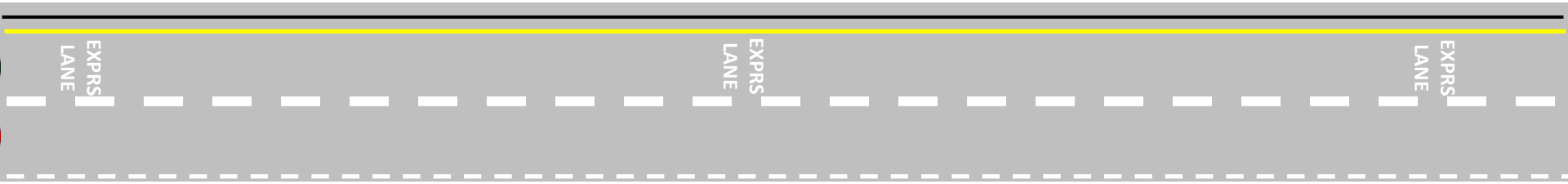


Proposed Express Lane Configuration

Existing HOV Lane



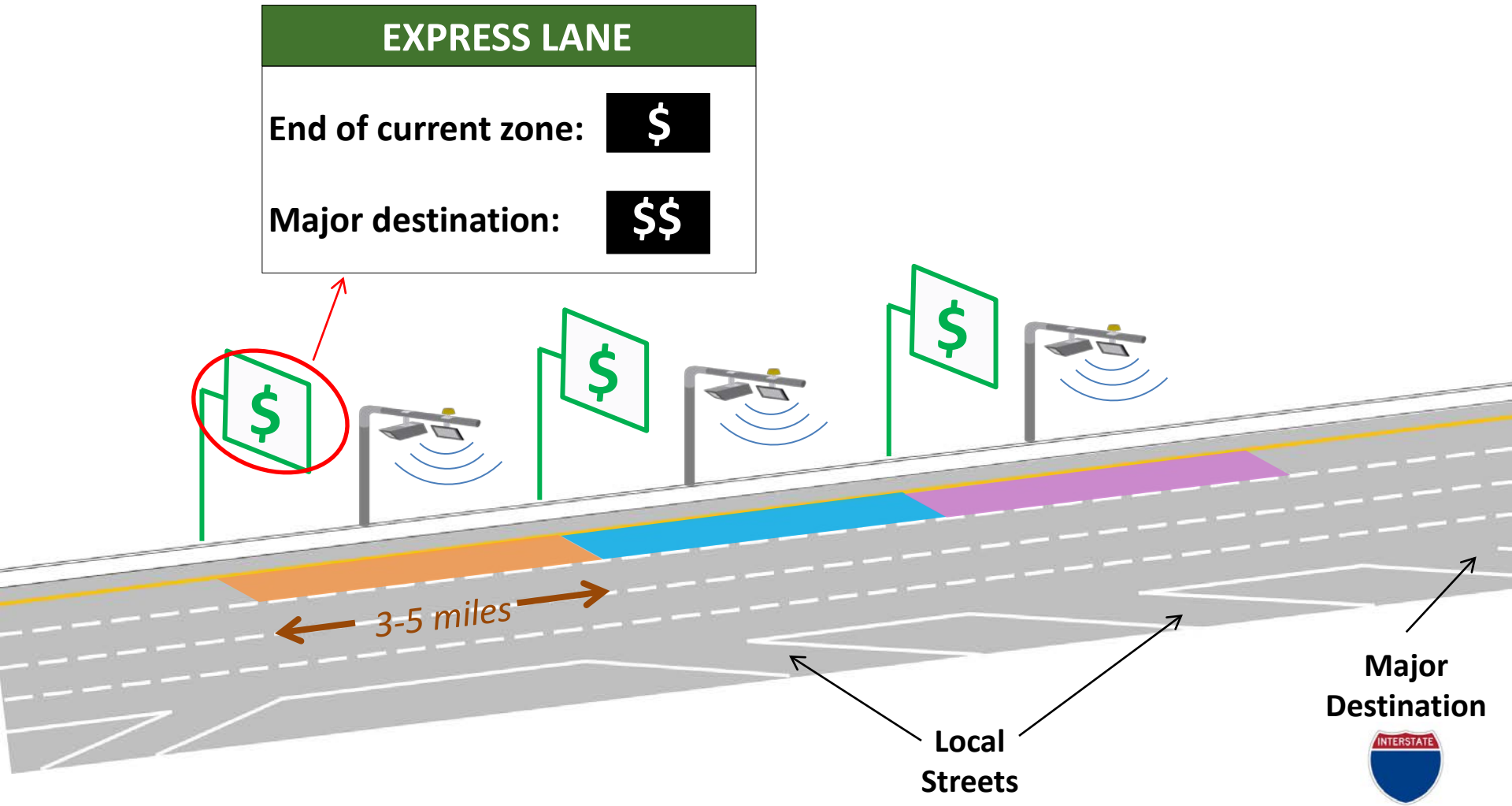
Express Lane Conversion



Express Lane Access Restriction

BAY AREA EXPRESS LANES

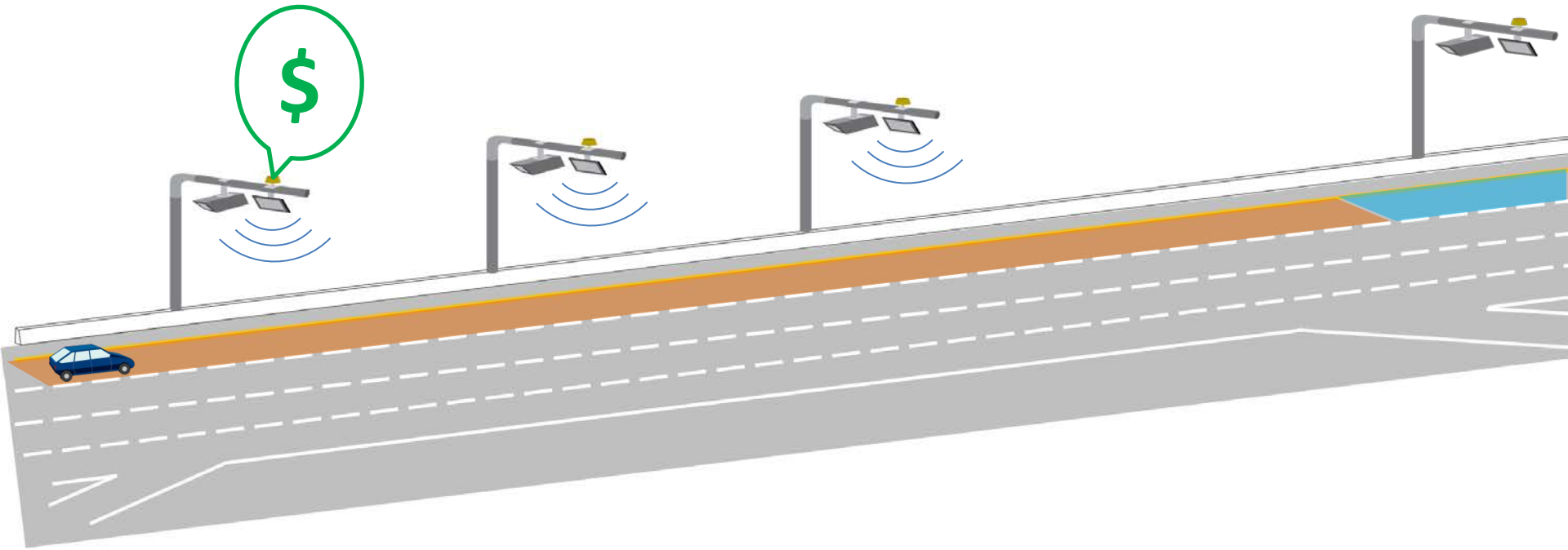
Pricing Zones



BAY AREA EXPRESS LANES

How Zone Tolls Work

Toll system charges **full zone toll** where vehicle is first detected



BAY AREA EXPRESS LANES

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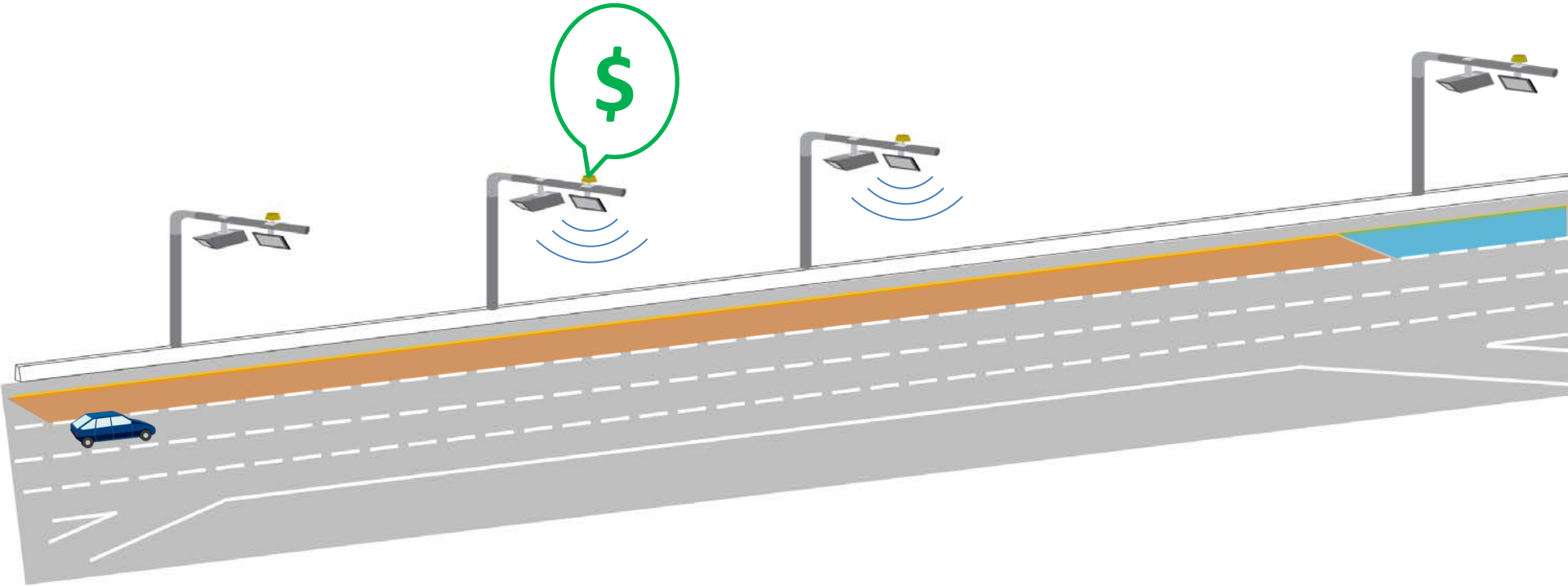
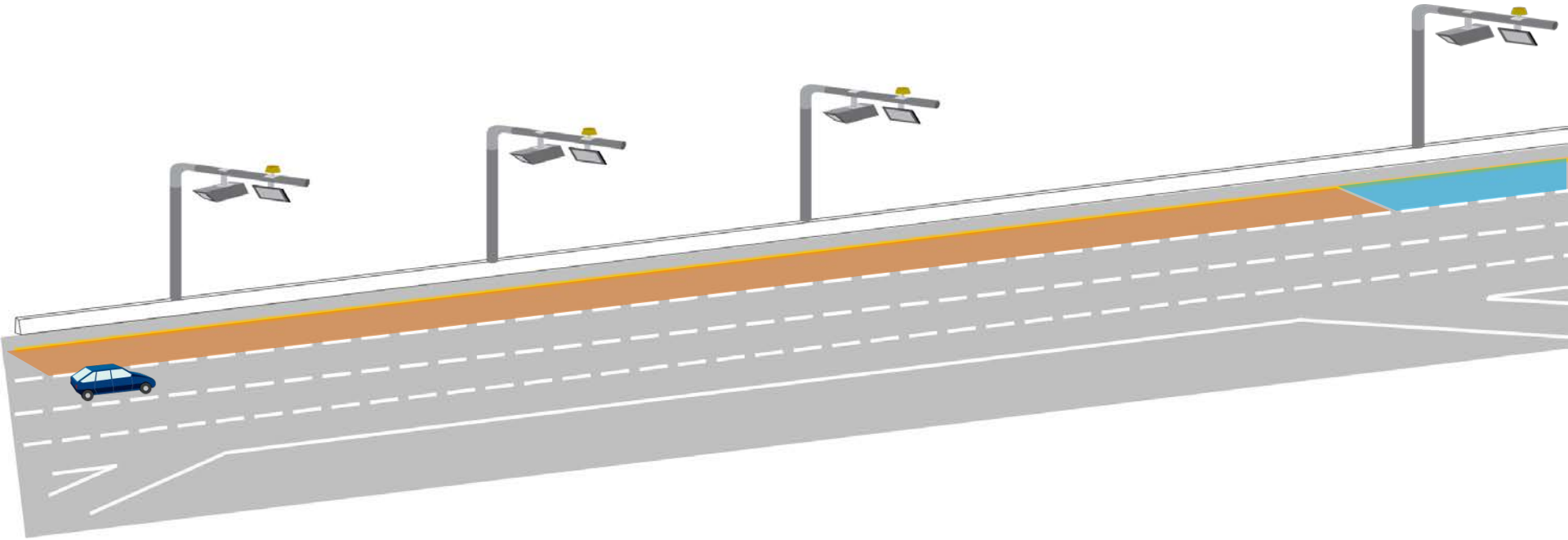


BAY AREA EXPRESS LANES

How Zone Tolls Work

No toll is charged for vehicles that enter at the very end of a zone.



BAY AREA EXPRESS LANES

Toll Tags Required for All Vehicles

Switchable Toll Tag

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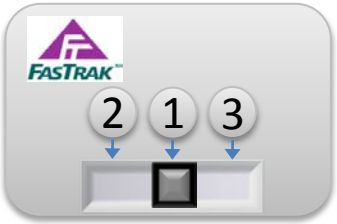
Carpool Free



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$ Toll

Legacy Toll Tag

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$ Toll

No Toll Tag Read

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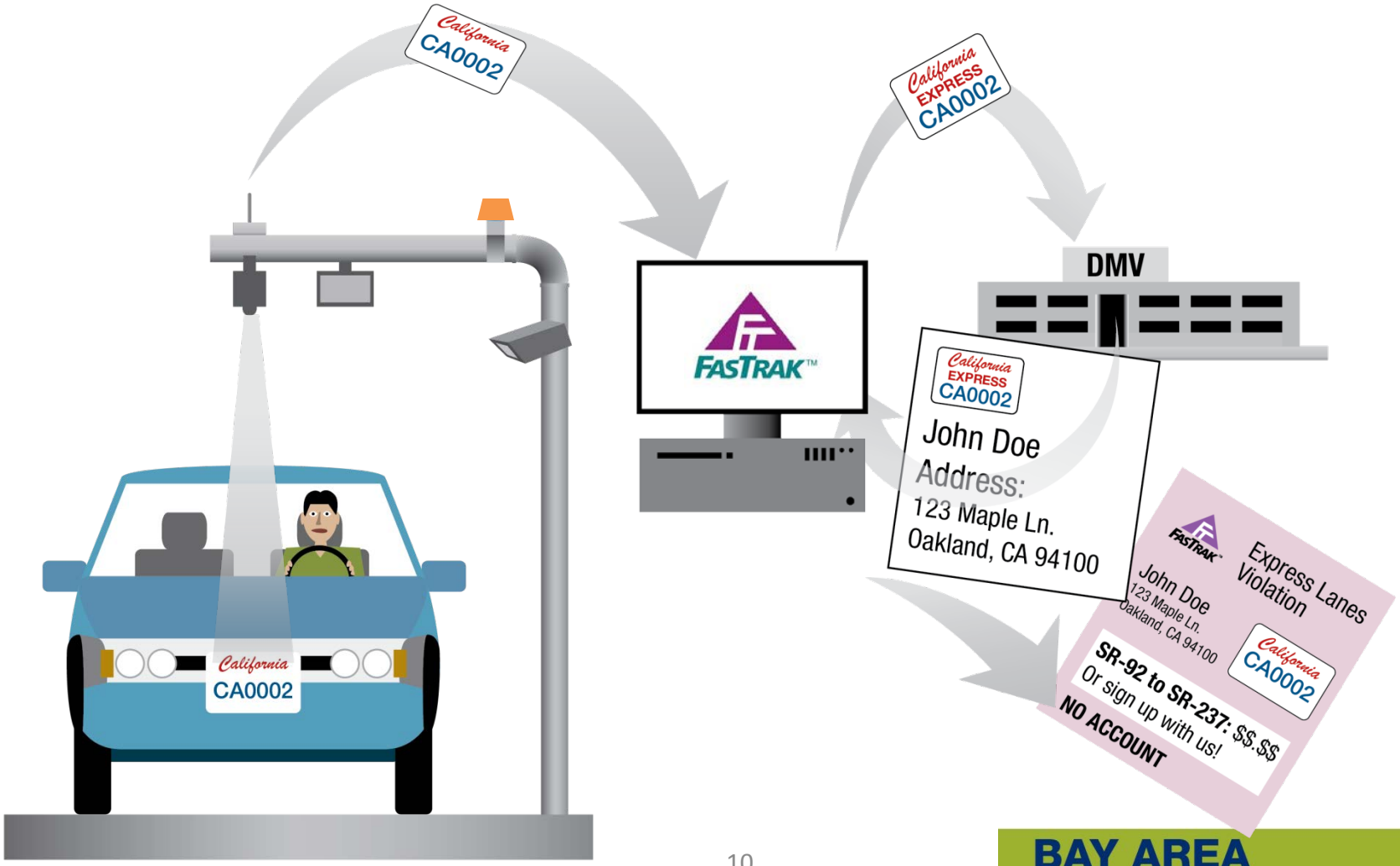
Toll $ or Violation

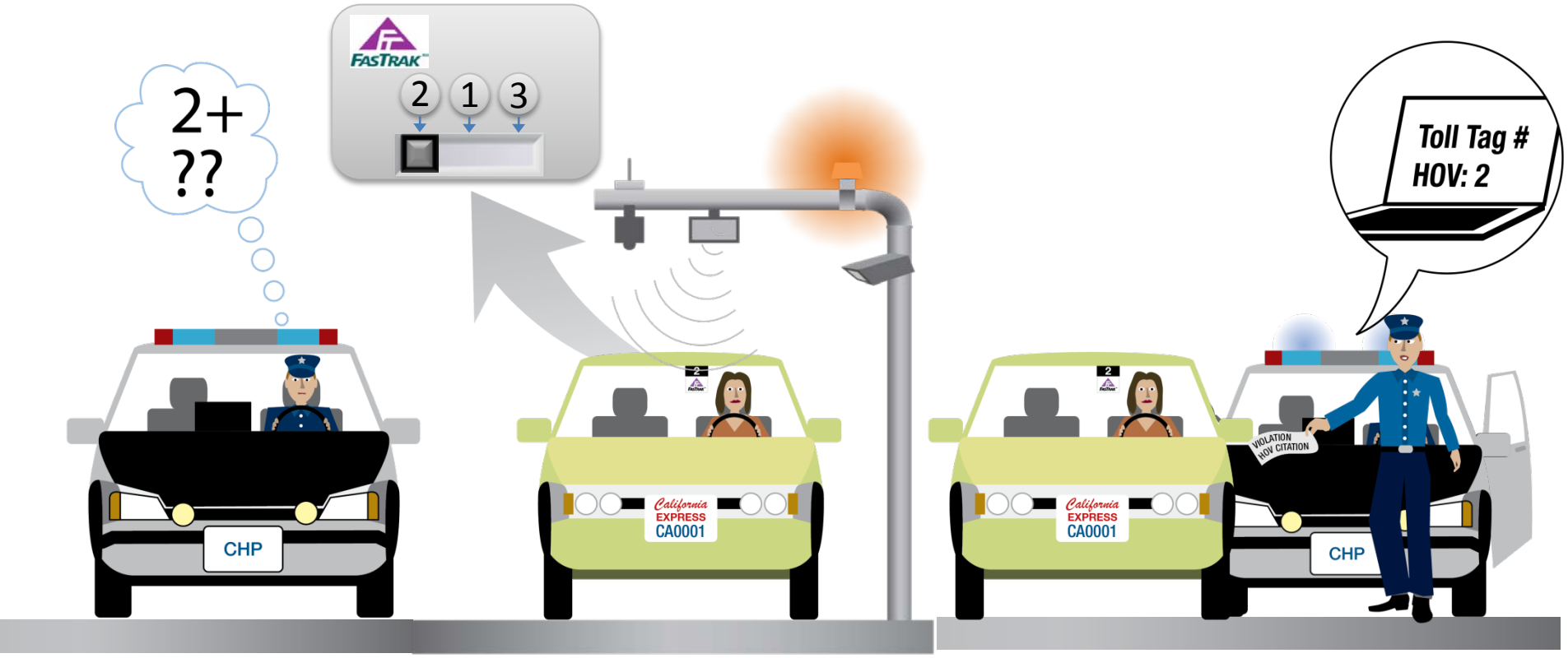
BAY AREA EXPRESS LANES

Toll Violation



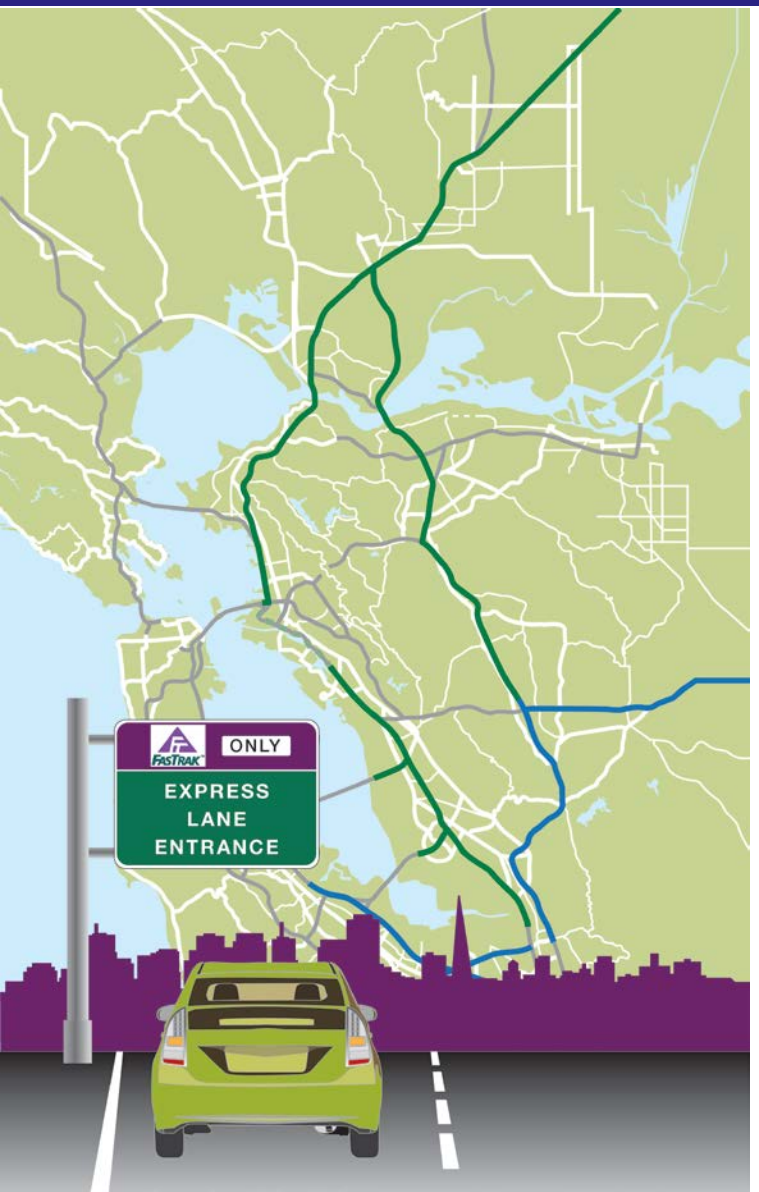
BAY AREA EXPRESS LANES

HOV Violation



BAY AREA EXPRESS LANES

Recommendation



- BAIFA to approve key operating features:
  - Open access lane configuration with occasional restrictions, coupled with zone-based tolling and dynamic pricing
  - Automated toll enforcement with switchable toll tags and license place recognition
  - Customer service by FasTrak®
- Questions?