Capital Area Regional Tolling Authority

Meeting Date: February 20, 2025
Agenda Item: 6

Tolling 101 Workshop

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Attachments: Yes

Recommendation:
None; this item is for information only.

Background:
In December 2024, the HNTB team held a workshop with city, county, and partner agency staff around the region. “Tolling 101” covered the basic elements of toll systems and established a general understanding of the common concepts and terminology used in the field. The board will receive an abbreviated version of this presentation (Attachment 6A) during this item. A shared understanding is essential for facilitating productive conversations between the CARTA board and staff, consultant teams, and partner agencies and as the agency begins to make near and long-term policy decisions.

This board “workshop” is the first in a series of presentations on tolling topics to prepare the CARTA board for policy decisions in 2025. This first Tolling 101 workshop will touch lightly on several topics that will be covered in more detail in future meetings.

Discussion:
Tolling is not a new concept, and modern priced roadway projects focus on solving two main problems. First, the need for a reliable source of funding for ongoing infrastructure and maintenance costs. Second, the need to manage congestion, particularly around urbanized areas.

Because tolling requires the management of revenue collection, toll agencies must behave like a business. They must consider long-term implications of debt service and other financial programs when developing work programs. Similarly, since revenue collection is built upon the processing of transactions, toll agencies’ constituents are also their customers. This requires a customer-centric approach that is sensitive to local interests.

CARTA joins a network of toll agencies across California. To date, most agencies are clustered in the state’s major urban areas; the San Francisco Bay Area and the Los Angeles Metro/Inland Empire. The other California toll agencies vary in structure. Some have built their own system of record-keeping for transactions and financial accounting, known as a “back-office system” or BOS. Others utilize existing back offices through agreements with other toll agencies.

Regardless of the BOS configuration, each toll agency uses a similar toll to create a transaction when a vehicle passes through a toll read point:

1. Scan – sensors recognize approaching vehicles and scan for electronic toll tags in their window. The system can also recognize the level of traffic congestion and determine the appropriate pricing level to manage it.
2. Identify – if there is a toll tag, the sensors use a radio frequency to identify the account
3. Confirm – cameras photograph the license plate and compare it against the plate on file
4. The toll is applied to the account. If the vehicle does not have a toll tag, the owner is identified by license plate, and billed by mail (invoice)
5. Audit – the system is audited to ensure each of the basic functions were completed successfully and accurately

To complete this process, a toll system is required to have four components:

Transponders/toll tags in vehicles

Toll tags can take several forms. There are switchable tags (Flex), in which the driver self-identifies the number of people present in the vehicle (to qualify High Occupancy Vehicle (HOV) discounts). Headlamp transponders, standard, and sticker tags do not allow for occupancy declaration (drivers always pay the full toll) and differ by their internal hardware, mounting location, and price per tag.

Roadside toll system/read point

Roadside equipment includes all the infrastructure necessary to measure toll tags. The components are clustered in what's known as a "read point" and include: roadside toll equipment enclosure, in-pavement vehicle detection and classification, front and rear vehicle camera, antenna for Automatic Vehicle Identification via radio frequency communication with transponder mounted on/in vehicles, and overhead vehicle detection and classification (optional)

Back Office System (BOS)

Once a vehicle passes through a read-point, this transaction is sent to the BOS, which processes the trip and bills it appropriately. In addition to transaction processing and billing, the BOS also provides account management, customer service (including self-service), revenue reconciliation, transponder inventory management, and a means for enforcement and collections.

Toll Host

The fourth component, a toll host, acts as an intermediary between the roadside and BOS. The toll host completes system monitoring and reporting that supports BOS functions. Additionally, the toll host is key to accurate customer billing since it assigns the rate of the toll to a transaction based on the price of the lane where the vehicle entered.

This toll transaction lifecycle describes what happens when everything goes right. However, if a vehicle uses the lane without a transponder, or doesn't have money in their account, or a proper tag read and image is not taken, toll agencies adopt processes to handle these other scenarios.