Tolling Payment Acceptance Market Sounding

Background Document

Invitation to Participate in the Market Sounding for Tolling Technology Payment Acceptance

California is home to one of the most complex transportation networks in the world and continues to lead in innovation at the intersection of mobility, payments, and technology. As interest in roadway pricing expands across the state, the California Department of Transportation (Caltrans) and the Los Angeles County Metropolitan Transportation Authority (LA Metro) are conducting this Market Sounding on tolling technology payment acceptance to identify opportunities to create a more seamless, user-friendly, and inclusive tolling system.

Through this Market Sounding, we invite insights from a wide range of industry participants including established tolling operators, payment providers, mobility platforms, automotive and in-car technology firms, and global innovators. Our purpose is to learn from innovations in payments happening in other fields as well as developments in tolling technology occurring elsewhere that may support California's goals.

This background document provides additional context on the roadway pricing ecosystem in California, recent tolling technology trends, and questions that Caltrans and LA Metro are interested in exploring further. Following publication of this document, the project team is available to respond to questions from interested parties and will publish responses on a rolling basis as needed. We look forward to receiving responses to the questions outlined in Appendix 1.

Your valuable contributions will help California create a more interoperable, cost-efficient, and user-friendly tolling system. Thank you for your consideration and input!

Kind regards,

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Contents

1. Overview

1.1 Introduction

The California Department of Transportation (Caltrans), in collaboration with Los Angeles County Metropolitan Transportation Authority (LA Metro), are conducting this market sounding as part of the Southern California Mobility Wallet Project to explore next-generation transportation payment solutions across modes of transportation. The purpose of this market sounding is to identify potential solutions for tolling payment acceptance, account management and customer service enabled by recent innovations in digital payments, technology, and roadside tolling infrastructure. The insights gained from this market sounding will inform future policymaking and initiatives by Caltrans, LA Metro, and other state agency partners.

The primary objectives for this initiative are to identify opportunities to:

1) Make tolled facilities more accessible for drivers by providing easier ways to pay;
2) Improve system management and efficiency by giving toll operators greater flexibility in a rapidly changing technology ecosystem; and
3) Integrate tolling with transit and other mobility payment systems to reduce friction and encourage multi-modal travel.

For this market sounding, Caltrans and LA Metro invite and encourage broad participation and diverse perspectives from a range of potential respondents, including toll operators, tolling solutions providers, payment orchestrators, fare payment system integrators, account management and CRM providers, digital wallet providers, car manufacturers, in-car payment solution providers, payment facilitators, and other organizations.

1.2 Roadway pricing in California

Roadway pricing describes a set of roadway management strategies used to either influence travel behavior or generate revenue. It is a key component in California's adopted statewide and regional transportation and climate plans. Any system where drivers pay to use a road (including traditional stationary tolls, express lanes, cordon pricing, and congestion pricing) fall into this category, while road usage charge would not. While tolling technology for all types of roadway pricing strategies are relevant for this market sounding, the primary focus is on express lanes. Express lanes are toll facilities where pricing is used – for solo drivers or those who do not meet high occupancy vehicle (HOV) requirements – on one or multiple lanes of a highway to manage congestion and provide a fast, reliable travel option for users. California already has many priced roads and bridges. Drivers have been traveling on them for decades, and many people are familiar with using express lanes when they need to prioritize a more reliable travel experience.

Responsibility for managing this infrastructure is done by multiple parties. Much of the tolling governance in California is delegated to local agencies, and each local tolling authority is responsible for the construction and operation of tolling infrastructure equipment in addition to processing toll revenue, though significant funding to build these facilities comes from federal and state sources.[1] The local tolling authorities and Caltrans share responsibility for maintaining the roads themselves. Caltrans is often the main source of non-local funding used to build roadway and tolling infrastructure across the state and also sets some policy for tolling, including by connecting requirements to funding.

[1] Authority for tolling comes from SHC 149.7, 149.9, and other adjacent sections (i.e., 149.X). Only a specific and narrowly defined set of agency types may seek authority for tolling.

The California Toll Operators Committee (CTOC) is the coordination group that oversees interoperability and technical standards between toll operators in California, centered around the use of FasTrak transponders for electronic toll payment.[2] Today, interoperability is enabled among CTOC agencies through daily interagency file exchanges supported by bilateral agreements for settlement and reconciliation of toll charges. For example, a driver using a toll bridge operated by the Bay Area Toll Authority (BATA) with a FasTrak transponder issued by LA Metro is identified as an LA Metro account through the file exchange. Under the bilateral settlement process, BATA is reimbursed for the toll as long as the transponder account is recognized as valid, and LA Metro coordinates any customer service issues associated with the trip given that the charge was incurred by a Metro account holder. If a driver uses the facility without a FasTrak account, BATA will capture the license plate using in-lane cameras and identify the registered vehicle owner using a California Department of Motor Vehicles (DMV) license plate lookup.

These days, it is not necessary for drivers to stop at toll booths to pay the toll. Toll operators in California use electronic toll collection (ETC), which is a roadside system that detects vehicle information as drivers pass through a toll zone. Some also have Open Road Tolling, which is a form of electronic toll collection where transponders pass through the toll zone without stopping but must still slow down and navigate a designated lane.

Toll operators generally contract with toll service providers for three categories of services: Roadside infrastructure, operational back-office systems, and customer service and account management.

- **Roadside infrastructure:** Roadside toll collection systems use radio frequency (RFID) technology to identify vehicles equipped with transponders (e.g., FasTrak in California), and roadside cameras to capture license plates for vehicle identification. For high-occupancy toll (HOT) lanes, a combination of self-declaration on the transponder, special cameras, sensors, and other hardware is used to determine vehicle occupancy for HOV eligibility enforcement. A challenge for toll operators is the permitting and complexity of deploying roadside infrastructure, especially for large express lanes projects with many tolling points or those located in dense urban areas.
- **Operational back-office systems:** The Back Office System provider is responsible for processing the data captured from the roadside equipment and applying business rules to generate accurate payment transactions. Core functions include trip building (combining individual reads or video captures into complete trips, applying location and time-based pricing rules) and system integration (connecting to clearinghouses, financial networks, and partner agencies to ensure secure transaction flow). A challenge for toll operators can be accommodating legislative requirements and technology changes in the long-term contracts with back-office system integrators using proprietary technology that can be difficult and costly to change.
- **Customer service and account management:** Customer-facing functions are included in a commercial back office. This role typically includes account application and onboarding, loading funds or linking payment methods (e.g., credit/debit cards, ACH, prepaid accounts), discount and eligibility verification (e.g., low-income), transponder fulfilment, and other customer service functions such as account management, communications, violation processing, and dispute resolution. In addition, it is responsible for payment processing (charging accounts, generating invoices, managing settlements, and reconciling transactions). A challenge for toll operators is providing quality customer service in an interoperable system where drivers may not know which agency to contact. For customers, the current systems

[2] CTOC is the statewide fulfilment of the interoperability requirements established by CCR Title 21, Div 2, Chap 16.

typically require users to sign up in advance of a trip, receive a transponder, and have funds to pre-load an account (although some limited pay-as-you-go tolling is available), which may limit the number of people who can benefit from express lanes.[3]

While the focus for this market sounding is primarily on back-office systems and customer service/account management, these elements interface and integrate with roadside infrastructure and enforcement to create a complete system.

1.3 Tolling technology trends

While the core use cases for tolling have remained consistent, the technologies and business models that deliver these services are evolving rapidly and unlocking new opportunities. This market sounding builds on recent Requests for Information (RFIs) issued by other State DOTs focused on the deployment of more cost-effective tolling systems.[4][5][6] Many states are rethinking how roadside, back-office, and customer-facing systems are deployed, with the goals of reducing costs, improving performance, and improving the customer experience. A review of recent RFIs and pilot projects across the US highlight several notable trends:

- **Third-party account management business models have potential.** New approaches to back-office systems have lowered barriers for third-party providers (3PPs) which are entities that pay the toll operator for trips made by their customers. Examples of 3PPs are carmakers like Tesla or Ford, fleet managers, like FedEx or Hertz, or account managers, like Apple or Google. The business model for 3PPs is to facilitate payments between the toll agency and the traveler, across multiple markets or toll authorities. 3PPs take advantage of global payment standards and are a key focus area for this market sounding as both an opportunity and a potential change to current business processes.
- **Some toll service providers are using AI/Machine Learning to improve performance.** Providers of video tolling and occupancy detection systems are using these tools and advanced data analytics to improve algorithms to increase accuracy and generate improvements and efficiencies in delivering customer service. For example, some toll operators are using AI to recover data from otherwise unusable license plate photos, while other transportation agencies are using machine learning to predict fraud in payments.
- **Convergence with connected vehicle technologies.** Some roadside systems are being designed or marketed for multiple uses in addition to purely tolling, including connected vehicle (V2X) applications, other smart road functions, and other in-vehicle payment and commerce systems. This trend suggests potential synergies with future mobility services, though use cases remain uncertain. For example, some toll operators are exploring the ability to offer in-vehicle toll information to supplement roadside dynamic message signs.
- **Interest and advancement in "infrastructure-light" roadside systems.** Tolling agencies are exploring alternatives to traditional gantries that require less capital investment and can be

[3] In Los Angeles County, drivers can apply in-person at a Metro ExpressLanes Service Center for the Low-Income Assistance Plan and receive a one-time $25 credit that can be used to provide the initial account credit or the transponder deposit. If approved, LA Metro will also waive the $1 monthly account maintenance fee. https://www.metroexpresslanes.net/offers-discounts/low-income-assistance/

[4] WSDOT – https://pr-webs-vendor.des.wa.gov/Search_BidDetails.aspx?ID=55909

[5] SANDAG – https://www.ibtta.org/sites/default/files/documents/RFP/RFI-20241231.pdf?utm_source=chatgpt.com

[6] NCTA – https://connect.ncdot.gov/business/Turnpike/ProcurementsLibrary/NCTA_Customer%20Contact%20Technology%20RFI_1.0.pdf

deployed more quickly, such as for special events. Examples include smaller-footprint gantries, pole-mounted readers (operating with solar power and cellular connectivity), and mobile app–based solutions to replace or augment roadside occupancy detection systems.

- **Integration of new technology is technically feasible but challenging.** There is a diverse range of business models among companies providing services to toll agencies, with some offering end-to-end solutions, and others specializing only in roadside hardware, back-office system integration, or customer service and account management. While many of the companies involved in the industry along this spectrum are willing to integrate with other providers' solutions, these integrations can still be significantly time and cost intensive for system integrators to accommodate and agencies to manage. Agencies can also choose to partner with another agency for example for back office and/or customer service operations. Agencies have to choose what system framework to follow upfront with long term operational and cost consequences that may not be known upfront.

1.4 Global case studies

Caltrans and LA Metro are particularly interested in exploring how tolling technology innovation is being implemented and how relevant these strategies might be to toll operators in the United States and California. We identified three global case studies that highlight recent technology trends.

European Electronic Toll Service (EETS)

EETS is a framework developed by the European Union to achieve interoperability of electronic toll collection across member states. The system provides a common account standard that enables drivers to access toll roads in multiple countries through a single contract with a certified toll service provider. While rooted in European regulatory and institutional contexts including compliance with Europe's General Data Protection Regulation (GDPR), EETS demonstrates how market design, standardization, and clear role separation can create conditions for innovation in tolling and related mobility services that benefit people driving while protecting driver information. The framework enables multiple types of organizations, such as fuel card issuers, energy companies, fleet telematics firms, automotive OEMs, and payment providers, to act as toll service providers. Individual drivers have the ability to choose among providers based on service offerings, cost, or integration with other mobility services, like parking or electric vehicle charging.

Singapore's Electronic Road Pricing (ERP)

The ERP system has been internationally recognized as a tool for congestion management, but an equally significant aspect is its role as an interoperable payment platform. From the beginning ERP's policy framework emphasized a consistent customer experience across modes of transportation. For example, the in-vehicle unit originally relied on stored-value smart cards, the same cards widely used for public transport. The next generation ERP2 system features connected On-Board Units (OBUs) connected via cellular networks. The new system facilitates interoperability across tolling, parking, public transport, and other vehicle-related payments.

North Carolina Turnpike Authority In-Vehicle Toll Payment Pilot Program

N.C. Turnpike Authority in partnership with Volvo Car USA, Mastercard, Microsoft, and others are piloting an in-vehicle toll payment system designed to eliminate the need for traditional transponders. This pilot program will enable enrolled Volvo car owners to register their car's vehicle identification number to a payment method with the toll authority, allowing automatic payments to be processed as the customer's car drives through a tolled section of roadway without the need for a transponder.

While the initial scope is limited to up to 100 pilot participants, the program is envisioned as a foundation for multi-service in-vehicle payments extending beyond tolling to include other payments like parking, fueling, and car washes.

2. Information for Market Sounding participants

2.1 Important dates

Caltrans and LA Metro will host a virtual Market Sounding Webinar/Q&A event on April 29th. Additional information can be found here.

Questions regarding the Market Sounding can be sent to ritu.muralidharan@dot.ca.gov and lilly.shoup@rebelgroup.com. We will collect questions and publish answers to them periodically.

We ask interested parties to submit their Market Sounding responses in the response format outlined in Appendix A. Email your responses to ritu.muralidharan@dot.ca.gov and lilly.shoup@rebelgroup.com. Parties who wish to participate without responding in writing may request an interview. Caltrans and LA Metro may invite selected parties to discuss their submissions in more detail, if interested. In addition, Caltrans and LA Metro reserve the right to request further clarifications on submissions.

2.2 Participation is voluntary

Participation by parties in this Market Sounding process is strictly voluntary and is neither a prerequisite nor a prequalification requirement for participation in any future opportunities related to the services described herein. Information provided by any participant as part of this Market Sounding shall not be construed in any way as part of a competitive solicitation.

Neither Caltrans nor LA Metro will be liable for any expenses incurred, including the expenses associated with the cost of preparing responses to this Market Sounding. Participants will bear their own costs associated with or incurred through this Market Sounding process, including any costs arising out of or incurred in the preparation and making of a submission, or any other activities related to this Market Sounding process.

2.3 Rights of Caltrans and LA Metro

This Market Sounding is not an agreement to solicit or purchase goods or services. Caltrans and LA Metro are not bound to enter into a contract with any participant that submits a response to this Market Sounding. Caltrans and LA Metro shall be under no obligation to receive further information, whether written or oral, from any participant or provide any feedback.

Caltrans and LA Metro, at our sole discretion, will decide if procurement is warranted. In the event that Caltrans or LA Metro decides to proceed with procurement, it will be conducted through an open and public competitive procurement process in accordance with State of California procurement policies and procedures.

2.4 Disclosure of information

The participants hereby agree that information provided in its submission may be disclosed by Caltrans and LA Metro where required by law, order of a court, or tribunal. Respondents should not provide a response that contains any confidential or proprietary information. Where responses are marked “Confidential” or “Proprietary” or include any confidentiality or proprietary notices, such markings or notices shall be disregarded and shall be of no force and effect. Caltrans and LA Metro

intend to publicize a relevant summary of the results of the Market Sounding. The participants are advised that Caltrans and LA Metro may be required to disclose all, part, or parts of a participant's submission pursuant to the California Public Records Act.

Caltrans and LA Metro may share summarized results of this Market Sounding with state, joint powers, and federal funding partners and may use the results to create a future Request for Proposals (RFP) to procure software, hardware, and/or services. We reserve the right to make public summarized versions of any information provided in response to this Market Sounding without identifying the respondent(s) involved (i.e., Chatham House Rules).

3. Areas for market feedback

Caltrans and LA Metro aim to identify next-generation transportation payment solutions across modes of transportation that build on recent technology trends and global best practices but also advance policy goals within California. This Market Sounding requests input on potential solutions for tolling payment acceptance, account management and customer service technologies and business models that support the state's climate, equity, and economic development objectives.[7]

The primary outcome from this market sounding is to **identify ways to make it easier for people to pay tolls.** California continues to invest in developing a statewide network of express lanes that allow people to pay for a reliable and efficient trip. Removing barriers to accessing the lanes ensure that everyone traveling can choose to use them if they would like to do so, with as little upfront effort as possible. This ensures that all Californians' can benefit from this important roadway infrastructure.

The second area of interest for this market sounding is to **improve the ability for toll operators to adopt, procure, and contract for new technologies** that could enhance system efficiency. Toll operators are responsible for managing corridors throughout the state and should be able to adapt to new technologies, driver preferences, and system changes to make cost-effective decisions about their own technology stack. Caltrans and LA Metro are interested in how the state could to more quickly and cost-effectively implement projects that create an inter-connected network of express lanes, particularly in the most congested areas of the state. Opportunities to deploy and test the viability of new technologies or business models within the current tolling ecosystem could increase adoption.

Finally, Caltrans and LA Metro are interested in opportunities to **enable customers to pay for tolls, transit, and other mobility services using a consistent method** to encourage multi-modal trips. California's transportation and climate plans emphasize the need to reduce vehicle miles travelled and provide multi-modal transportation alternatives to driving. Pricing is a well-established strategy to shift travel demand from driving to other options, like transit, rail, walking, and bicycling.

To guide respondents, we have identified several broad areas where we see potential to advance these goals through tolling technology payment acceptance. We invite respondents from the industry to provide feedback on these hypotheses when responding to the specific questions outlined in Appendix 1.

- **A tolling ecosystem with multiple third-party providers (3PPs) for drivers to choose from will increase access to toll facilities.** Giving drivers choices for how they set up and manage payment tolling accounts enables more drivers to choose to use priced facilities (including both existing customers and entirely new customer segments), which will increase revenue for toll operators. In this model, the 3PPs 'own' the customer experience, and 3PPs are

7 California Transportation Plan 2050. https://dot.ca.gov/-/media/dot-media/programs/transportation-planning/documents/ctp-2050-v3-a11y.pdf

commercially incentivized to improve the customer experience to capture a larger share of drivers. Some of these new 3PPs may be existing accounts that drivers already possess for other mobility modes that can be extended to cover tolling, while other new accounts may come from auto OEMs or other payment providers. Standard agreements would be required to both remove barriers to entry for new 3PPs and to put in place the necessary guardrails and minimum standards for participation in the ecosystem.

- **Enabling multiple 3PPs through standardized data formats can facilitate cost effectiveness for local toll authorities.** Standardized interface control documents and other data formats could be developed and deployed across all California toll operators to enable more efficient back-office integration of 3PPs. At a minimum, these standard data formats could be used for basic transaction information to facilitate 3PP billing. However, deeper standardization of back-office integration could also enable more robust 3PP customer service models by allowing for full access to account information to facilitate lookups and other data needed to process disputes and violations.
- **The inclusion of multi-modal 3PPs in the tolling ecosystem could unlock opportunities for discounts and pricing algorithms that are integrated across modes.** The improved convenience and customer experience of multi-modal accounts could lead to more multi-modal trips, as demonstrated in other parts of the world. This shift could also be accelerated by using 3PPs to send price signals to shift travel demand when needed. For example, during period of peak demand for travel, a transportation agency could pay drivers to use other modes of transportation while simultaneously increasing the price of a road, bridge, or tunnel.

Appendix 1. Response Format and Questions

Please maintain question numbering and limit your overall response to no more than twenty (20) pages, excluding background information. Note that you are not required to answer all questions, and we ask you to give extended answers to those questions where you believe your expertise is most relevant.

Background information

- Organization name or registered legal business name
- Brief overview of your organization, including legal structure (e.g., corporation, partnership, joint venture, parent, subsidiary, affiliate, non-profit, academic, public agency, or other)
- Place and date of incorporation (if applicable)
- Name and contact information for the person who is primarily responsible for this submission

State-wide objectives and roles

This Market Sounding seeks to identify innovative solutions for toll payment, account management, and customer service using new digital technologies that improve access for drivers, increase efficiency for operators, and enable integration with transit and other mobility systems.

1) What solution(s) does your organization provide that would meet one or more of these goals?
2) What support (financial, regulatory, commercial, etc.) would be needed by your organization to bring these solutions to California?

Building the Third-Party Provider (3PP) ecosystem in California

We are interested in assessing how allowing multiple Third-Party Providers (3PPs) could increase access and improve the customer experience by giving drivers more choice and flexibility.

3) How would toll operators transition responsibility for customer account management and customer services from the current account management system to allow 3PPs?
4) What do you view as the primary *technical* challenges with establishing and managing a tolling ecosystem with multiple 3PPs?
5) What do you view as the primary *commercial* challenges with establishing and managing a tolling ecosystem with multiple 3PPs?
6) What specific guardrails should California establish around the business model for 3PPs to ensure transparency in fees for drivers?
7) In a future tolling ecosystem with multiple 3PPs, how can toll operators mitigate the financial risk of non-payment to tolling agencies for toll transactions processed through 3PPs?
8) In a future tolling ecosystem with multiple 3PPs, how can toll operators ensure that customers receive accurate and consistent information about the tolling rules of each tolled facility (e.g., cost and discount information, occupancy rules for priced lanes)?

Establishing specifications

Standardization of data formats and interfaces allow multiple 3PPs to operate efficiently within California's decentralized tolling environment. Common standards for transaction data, financial processing, settlement and reconciliation processes, and customer accounts can lower integration costs and remove barriers for new providers.

9) What role should state agencies and toll operators respectively, or collectively (such as through CTOC) play in establishing technical standards for participation of 3PPs (e.g., related to privacy and security, customer interaction, back-office interoperability, user interface, etc.) and validating compliance of 3PPs with those minimum standards?

10) In Europe's EETS system, 3PPs (called 'tolling providers' under this scheme) must comply with a specific technical data standard established by ISO that defines information transfer mechanisms between back-office systems and toll operators. Is application of a similar data standard feasible for establishing an interoperable system with multiple 3PPs in California? What are the governance considerations for doing so within the US and California regulatory context?

11) Which specific elements of back-office interoperability would be easiest to standardize (i.e., create standard data formats)? Which elements would be most impactful?

12) Which specific elements of the user interface / customer experience would be easiest to standardize? Which elements would be most impactful?

Customer experience & multimodal integrations

Today in most parts of California, drivers pre-enroll, receive a transponder, and maintain a prepaid balance, creating barriers for all people to benefit from tolled roads. Further, many people also pay for transit, shared mobility, and other modes or services. Integrated accounts and pricing strategies could reduce friction for travelers, encourage shifts toward more sustainable travel behavior, and support California's financial inclusion goals for the under- and un-banked.

13) What role could or should incentives (e.g., discounts, loyalty programs, multi-modal travel credits) play in a 3PP ecosystem?

14) How can 3PPs reduce barriers for unbanked or underbanked users to access tolled lanes?

15) What lessons can be drawn from other sectors (e.g., banking, mobile payments, transit) regarding successful multi-account provider ecosystems?

16) What specific considerations must be taken into account for 3PPs that also manage accounts and payments for other mobility modes to play a role in roadway pricing?

17) Should California consolidate commercial back office operations under one statewide contract encompassing toll payments and multi-modal travel, either as a complement or alternative to an ecosystem with multiple 3PPs?

18) Do you have any other thoughts or responses to the areas for market feedback either not included in answers to the questions above, or that you think should be emphasized further?