



**City of Mountain View**

**North Bayshore  
Congestion Pricing Feasibility Study**

# **Technology and Administration White Paper (DRAFT)**

**April 2021**

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**NORTH BAYSHORE CONGESTION PRICING FEASIBILITY STUDY | TECHNOLOGY AND  
ADMINISTRATION (DRAFT)**  
City of Mountain View

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## INTRODUCTION

### What is Congestion Pricing?

Congestion pricing typically establishes a fee for driving into or within specific areas during peak congestion. Congestion pricing has been implemented throughout the world and is being studied in major metro areas throughout the U.S., including Los Angeles, Seattle, Washington D.C., and San Francisco. New York City is in the process of implementing a congestion pricing program in lower Manhattan.

Congestion pricing can take different forms, including:

- **Cordon pricing:** Vehicles pay a fee when crossing a boundary into a specific zone.
- **Area pricing:** Vehicles pay a fee for driving *inside* a specific zone.
- **Variable pricing of entire roadways:** Instead of a fixed toll rate on toll road, toll rates are varied throughout the time of day.
- **Express Lanes/High Occupancy Toll (HOT) lanes:** Vehicles pay a fee or meet occupancy requirements to managed lanes on a highway corridor.
- **Fleet pricing:** Certain vehicle types, such as ride-hailing vehicles, pay a fee to drive in a specific zone.
- **VTM pricing:** Vehicles pay a fee based on the distance they travel (measured in vehicle miles traveled, or VMT) in a certain zone.

### What is the North Bayshore Congestion Pricing Feasibility Study?

Before the COVID-19 pandemic, traffic congestion in Mountain View's North Bayshore district (Figure 1) was an ongoing challenge, with thousands of vehicles clogging the three district gateways daily. To minimize congestion and enable district growth, the City of Mountain View set a target for a 45% single-occupancy vehicle (SOV) mode share and a vehicle trip cap for the district and its three gateways.

More and better travel options to North Bayshore are planned and efforts to encourage commutes by transit, biking, and walking have helped keep congestion from worsening. North Bayshore has not met its mode share or trip cap goals, however, and planned development threatens to exacerbate congestion problems.

The long-term impacts of COVID-19 remain unknown, but the City is planning for a return of congestion to a 'new normal.' To address the likely return of congestion, all potential tools for reducing congestion—including congestion pricing—need to be explored. The North Bayshore Congestion Pricing Feasibility Study will assess congestion pricing's potential role in reducing traffic in North Bayshore.



## Project Goals

The City of Mountain View is balancing a potential congestion pricing program's goal of congestion reduction with other key district priorities. These goals will guide program development and evaluation of program options.

- **Reduce congestion**
- **Support economic development**
- **Advance social equity**
- **Promote health and the environment**

## What are the White Papers?

As part of the North Bayshore Congestion Pricing Feasibility Study, three white papers on key congestion pricing issues have been developed. Each white paper explores a key issue by examining peer approaches, assessing best practices, and identifying how those best practices could be applied to the successful implementation of congestion pricing in North Bayshore. The three white paper subject areas are:

- Equity
- Finances 101
- Technology and administration

**Figure 1 North Bayshore Congestion Pricing Feasibility Study Area**



## TECHNOLOGY, IMPLEMENTATION, AND ADMINISTRATION

### Technology Systems

As the City of Mountain View explores congestion pricing tools for further study and potential implementation, the City will need to consider how potential congestion pricing technology supports its pricing program goals and objectives. The technology systems will need to perform two primary functions: 1) accurately and correctly charging travelers; and 2) ensuring travelers make payments and obey rules (i.e., enforcement). To adequately charge and enforce, a pricing technology system should include the following elements:

- **Vehicle identification devices:** In addition to using images of vehicle license plates, congestion pricing systems can also use devices attached inside or outside a vehicle, integrated with a vehicle, and/or carried by drivers and passengers to identify vehicles.
- **Roadside detectors and enforcement equipment:** Most congestion pricing systems use devices on the roadside or over the roadway to detect vehicles that are equipped to pay the charge or are evading it.
- **Back-office customer service center (CSC):** A congestion pricing system requires back-office CSC technologies to manage customer accounts, process transactions and payments, interface with other external systems (e.g., the California Department of Motor Vehicles), conduct audits and financial reconciliations, set prices, and monitor performance.

There are a range of technology solutions that support these three primary congestion pricing technology elements. Some of these most important options are discussed below.

### Toll Collection Systems

Modern electronic toll collection systems are highly automated through Automatic Vehicle Identification (AVI) and Automatic License Plate Reader (ALPR) technologies, which identify vehicles without affecting traffic flow. In most tolling situations, AVI antennas are mounted over roadways to read transponders in vehicles, which identifies customers with pre-paid toll accounts.

ALPR cameras are mounted overhead to capture images of license plates and identify vehicles without a transponder. The toll system uses the images to match a vehicle to a pre-paid account and charge the proper toll or—in the event no account is detected—send the vehicle owner an invoice or a violation notice.

**Figure 2 Images of AVI Antennas to Read Transponders and Cameras to Photograph License Plates**



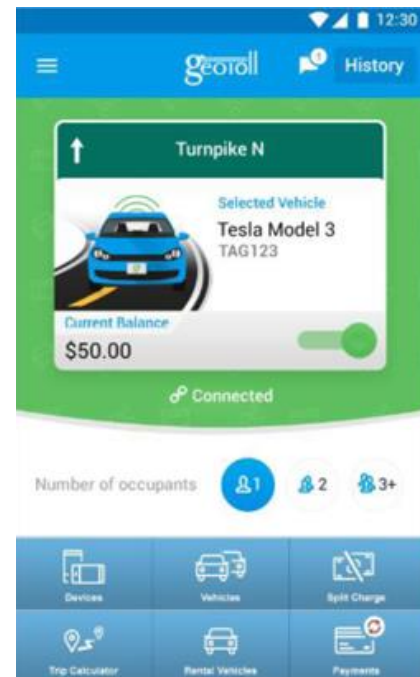
Left: a toll gantry used for open-road tolling on SR 241 in Orange County, CA.<sup>1</sup> Right: toll equipment in Milan, Italy.<sup>2</sup>

## Mobile Apps

Several mobile app companies use cell phone-based technologies, such as global positioning systems or 5G wireless positioning features, to determine a vehicle location and assess tolls. Vehicle owners must opt into these technologies by downloading a mobile app. When the app user crosses a tolling point, the app sends the toll and the associated license plate number to the toll facility operator to reconcile with license plates that would have been captured on the roadway.

Some app companies also use Bluetooth-based technologies to identify the number of vehicle occupants for discounts and occupancy enforcement. Although some firms promote “virtual” toll points, toll operators still need some form of enforcement technology (e.g., ALPR) on the roadside to collect payment from travelers without apps.

These mobile apps can also provide travelers with pricing information and reduce the need for electronic signs.



**Figure 3 The GeoToll Payment App**

<sup>1</sup> Image source: Silicon Transportation Consultants

<sup>2</sup> “Area C gate in Porta Ticinese” by Ita140188 is licensed under [CC BY-SA 3.0](https://creativecommons.org/licenses/by-sa/3.0/).

## Connected Vehicles

Despite the lack of a federal mandate for the installation of dedicated short-range communications in new vehicles, many vehicle manufacturers are pressing ahead with technologies that will allow their vehicles to communicate directly with other vehicles, as well as with roadside infrastructure. For instance, Ford is planning to equip all their 2022 vehicles with 5G network communication capability. Existing vehicles without built-in connectivity could be equipped with retrofit kits.

These connected vehicles present opportunities to leverage their communications capabilities to automatically toll vehicles. Some road usage charge (RUC) pricing programs are piloting new technologies using connected vehicle technologies.

## Parking Payment Systems

Significant advances in on- and off-street parking payment technologies have been made in the past decade. In general, parking systems have become increasingly automated and now support electronic payments that operators use to collect payments more cost effectively. The combination of this growth in payment systems and ability for local governments to tax parking operators could allow the City of Mountain View to collect parking-related congestion pricing fees more easily. Mobile payment apps and smart sensors have also revolutionized the ability for parking operators to dynamically price and manage parking inventory.

## Implementation

Understanding implementation is important for analyzing the suitability of congestion pricing technology systems. The following sections address considerations related to the implementation of a potential congestion pricing program in North Bayshore. A summary matrix is included (Figure 4) to assess how these implementation topics relate to the City's pricing options.

## Technology Systems

There are several key technological considerations for implementing a congestion pricing program.

- **Technology Maturity:** Deploying existing technologies will likely be less expensive and reduce scheduling risks, compared to deploying emerging or in-development technologies. Implementing existing technologies should be weighed against the risk of the technology becoming obsolete in the near future, or of being vulnerable to future market disruptors.
- **Physical Roadside Presence:** The physical footprint of technologies will be important in urban environments where open space and visual aesthetics are at premium. For instance, a typical tolling system requires overhead mounted antennas and cameras to effectively read transponders and capture license plates; these would need to be installed throughout the corridors to provide effective compliance.
- **Customer Experience:** The more the technology requires the driver to actively participate, the more difficult it will be for the technology to be adopted and for pricing

to be applied accurately and reliably. For instance, a technology that requires customers to download an app and track mileage manually would be less effective than a technology that captures license plates and automatically sends a bill to a customer.

- **Compatibility with Other Pricing Programs:** Coordinating with other tolling or pricing programs will help create a more seamless customer experience for travelers. The City of Mountain View may want to pay special attention to coordinating with Santa Clara and San Mateo counties, as they are in implementing tolled express lanes on US101 and SR-237. The Bay Area Toll Authority (BATA) operates bridge tolls on the Dumbarton Bridge. BATA also operates the Bay Area CSC, which all Bay Area FasTrak customers use. Adopting FasTrak transponder technologies and using the BATA CSC may make a congestion pricing program in North Bayshore less confusing for users and provide providing savings through economies of scale.

## **Equity**

Selection of particular technologies and methods for pricing should consider impacts on different demographic and income groups in the region. Expensive or complex pricing methods may not only unfairly burden lower-income travelers, but may also cause these groups to be punished as violators due to their lack of access to the correct technologies. Although some programs have violation forgiveness or grace period rules, this may only support some low-income travelers, as many people with low incomes lack the cash on hand to open a prepaid account.

The overall customer experience, including how travelers enroll, pay, and use priced facilities should also be carefully considered and steps taken to reduce inequitable impacts. An example of equity in congestion pricing payment would be allowing those without access to traditional banking services to use alternative payment methods, such as cash kiosks at local stores. This approach is used in the Bay Area, where people with cash can pay FasTrak tolls at 'Touch-n-Buy' kiosks located throughout the region.

## **Enforcement**

Congestion pricing enforcement is a delicate balance of revenue lost to scofflaws, perception of enforcement effectiveness by the public, and the cost of the enforcement itself. While true 100% enforcement may be cost prohibitive, not investing enough in enforcement could upset regular paying customers and reduce revenue. In addition, pricing methods such as mobile apps are effective for paying customers, but do nothing for catching and charging drivers without apps. In some congestion pricing programs, a layered, multiple-technology approach to enforcement may be needed, such as a combination of cameras, connected vehicle data reporting, and police enforcement.

## **Cost**

Selecting pricing scenarios and technologies should consider both the one-time startup cost of implementation and ongoing operational costs to understand overall lifecycle costs. Cost should be examined in the context of likely revenues. If a certain pricing scenario can raise



more revenue than the cost to operate and implement it, the program may be able to provide equity-based discounts or spend net revenue on transportation investments. Funding sources for program capital and operational costs could also influence the pricing technology and delivery method selected. For example, Mountain View may consider a public-private partnership delivery method to take advantage of private financing.

## Policies/Legal

The City of Mountain View should consider the policy and legal implications of implementing congestion pricing as it explores potential pricing technology. The more important policy and legal considerations are discussed below.

- **Authority to price:** Road tolling authority in California is authorized at the State level through the Streets and Highway Code (SHC). Raising the cost of parking as a form of congestion pricing, however, could be imposed by the City directly.
- **Privacy:** Consumer privacy protection is always raised when a congestion pricing program is considered, particularly with respect to collecting personally identifiable information (PII). In the case of road tolling, California SHC Section 31490 explicitly allows for the collection of vehicle location data, images, and payment information for the express use of electronic toll collection. Privacy concerns are generally focused on the photographs taken of vehicles or data regarding the time and location of toll transactions. Privacy advocates often argue that any image or toll data be quickly deleted and data used for tolling purposes only (i.e., not accessible to law enforcement, sold to third parties, etc.). Although SHC § 31490 requires that PII be destroyed after four years and six months, additional privacy safeguards could include providing payment methods where customers can remain anonymous and structuring toll systems so data are collected and stored by a private toll service provider and never accessed by public agencies.
- **Revenue and fee policies:** Because congestion pricing would create a new revenue source for the City of Mountain View, the City will need to develop revenue use policies that safeguard revenues to cover operational and maintenance costs. Additionally, plans for violation fees and how aggressively they will be assessed and collected should be developed.
- **Regional consistency:** Being regionally consistent with other toll operators in the Bay Area should be strongly considered, to avoid potential public confusion and distrust. Some elements of regional tolling consistency that would be important to customers of a North Bayshore congestion pricing program include the ability to use existing FasTrak accounts, the ability to pay tolls and dispute charges through existing avenues, having similar fees and violation escalation policies, and receiving a unified marketing approach with similar language, signage, and branding.

## **Customer Ease of Use**

Adopting technologies in Mountain View that are already deployed in the region, such as FasTrak, would reduce costs and increase customer convenience. The more automated payments, and the more streamlined business rules are made, the easier it is for the public to participate. Congestion pricing programs that require more frequent customer interactions, such as manually tracking mileage, will likely make compliance more difficult.

## **Overall Ease of Implementation**

In some contexts, the ease with which a congestion pricing program could be implemented is critically important. Figure 4 scores four potential congestion pricing scenarios on five categories of ease of implementation, assigning a rating of easy to implement, moderately difficult to implement, and most difficult to implement.

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**Figure 4 Tolling Technology/Implementation Ease Matrix**

Pricing Scenario	Pricing Method	Technology	Equity	Enforcement	Cost	Policies/Legal		Ease of Use
						Legal	Privacy	
Cordon and Area Pricing	Existing tolling technology	Existing AVI and ALPR technology, regionally consistent with FasTrak transponders and accounts	Can use existing FasTrak payment methods, which address some equity concerns	Billing registered owner with license plate	Upfront construction costs	Need tolling authority	Some privacy concerns already legislated into SHC § 31490	Can use existing FasTrak toll accounts
	Mobile apps	Existing technology	Need for smartphone means program may be inaccessible for some users	Needs to be coupled with roadside enforcement	Minimal development costs, operational costs depend on enforcement approach	Need tolling authority	Introduces an additional layer of data collection and storage	Minimal effort for customers to download and sign up but could miss people without phones
	Connected vehicles	Not universally available or installed	Connected vehicle technology may not be available on lower-cost vehicle models	Needs to be coupled with roadside enforcement	Requires new technology to support	Need tolling authority	Introduces an additional layer of data collection and storage	Requires setting up toll accounts
Parking Pricing	Price existing parking	Existing technology	Can leverage existing parking payment methods, which address some equity concerns	Using existing means of parking enforcement	Depends on whether existing parking has access control and a method to collect payments	Need to impose parking fee/taxation	May introduce an additional layer of data collection and storage	Depends on if parking has access control

**LEGEND**

Easiest	Moderate	Most Difficult
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## Administration

Administering a congestion pricing program involves program oversight, as well as management of third-party operators or contractors.

- **Program oversight** includes developing policies and business rules, auditing and financing responsibilities, and monitoring the performance of the program.
- **Managing the technology contractor** entails contracting for the pricing technology contractor and overseeing its operations.

Based on the City of Mountain View's staffing resources and how much direct control it wants to retain, the City will need to decide how much program administration it wants to conduct. For managing the pricing technology, the City has the choice to either manage it entirely in-house, outsource part of the oversight to a regional partner, or outsource it entirely.

- **Direct management of technology vendor:** The advantages of building and operating a roadside system in-house include being able to control pricing rules and policies more easily, as well as the construction, maintenance, and operation of the physical infrastructure. A downside of this approach would be the City having to develop the staffing resource and expertise to procure, implement, and oversee technology vendors.
- **Leverage a regional pricing partner:** Because there are multiple tolling and parking pricing programs already operating in the Bay Area, the City could leverage a regional partner to manage a portion—or all—of the technology vendors needed. Besides having staff with pricing experience, these agencies have roadside and CSC vendors already contracted that the City could potentially utilize. Drawbacks of leveraging a regional partner are that the City would lose flexibility because of having to coordinate through an additional agency to make decisions and changes, such as changing pricing rules or contracts.



## PEER APPROACHES

### Technology Systems

All peer congestion pricing programs with some sort of zone-based pricing use roadside tolling technology for payment collection and enforcement. Stockholm, Milan, and Singapore, use a combination of AVI (which read transponders) and ALPR (which reads license plates) to charge vehicles. Transponder transactions provide better accuracy and cost less to process, whereas ALPR transactions cost more to process because they require a certain level of human image review and can reduce revenue when license plates are unreadable.

In addition, most peer programs operate in toll road contexts so many of their customers already have toll accounts and transponders. Some peers, like London, have programs that only use ALPR, since cameras placed on the roadside are less intrusive and conspicuous in an urban setting than overhead gantries needed to support AVI antennas to read transponders. Examples of gantry-mounted AVI readers and pole-mounted cameras are in Figure 5.

Figure 5 Pole- and Gantry-Mounted Tolling Infrastructure



From left to right, Singapore overhead toll gantry for AVI antennas;<sup>3</sup> Stockholm overhead toll gantry for AVI antennas;<sup>4</sup> London roadside ALPR camera mounted on pole.<sup>5</sup>

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<sup>3</sup> “ERP gantry at North Bridge Road” by mailer\_diablo is licensed under [CC BY-SA 3.0](#).

<sup>4</sup> “Automatic detection system at Stockholm’s first electronic gantry at Lilla Essingen.” by Tage Olsin is licensed under [CC BY-SA 2.0](#).

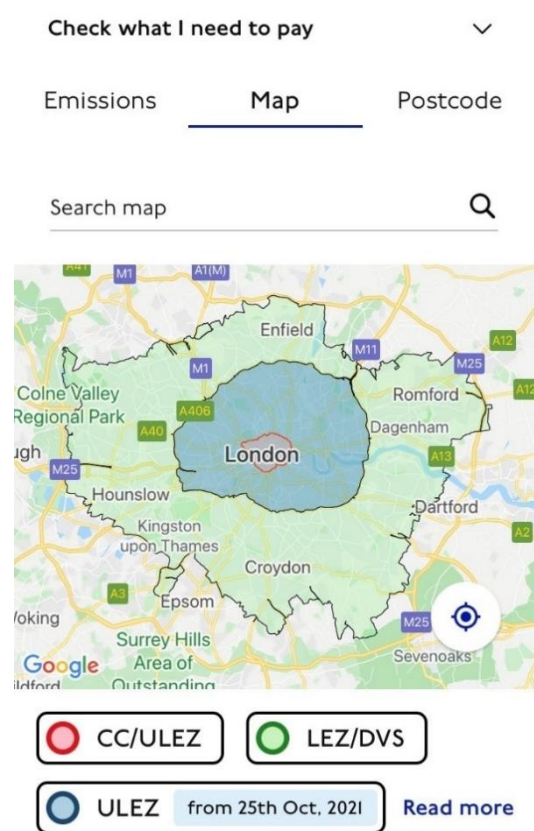
<sup>5</sup> “Entrance to the London Congestion Charge zone. Shown traffic sign and the CCTV used to control vehicles entering the zone’s boundary.” by Mario Roberto Duran Ortiz is licensed under [CC BY-SA 3.0](#).

Beyond current tolling technologies, some cities are leveraging new in-vehicle technologies and payment methods for their congestion pricing programs. London uses a mobile app to identify and charge drivers (see for an image of the London congestion charge mobile app). RUC pilots are also expanding the potential for congestion pricing implementation. This year, the Oregon Department of Transportation's OReGO RUC program started an area pricing pilot for downtown Portland.<sup>6</sup>

Parking pricing technologies have proliferated in recent years. These technologies include smart parking payment systems, meters, and mobile app payments. However, most parking-based congestion pricing programs target on-street parking with smart meters and payment apps, which may not be as applicable to off-street parking pricing that might occur in North Bayshore. The San Francisco Municipal Transportation Agency's (SFMTA's) SFPark program, however, does target publicly owned off-street garages and illustrates the ability to adapt parking management systems to implement dynamically assessed congestion pricing charges. To explore this concept in North Bayshore, the City will need to engage with private parking operators and learn if they use parking management systems, as well as if a congestion pricing charge can be applied through those systems.

## Administration

There are many examples of how cities administer congestion pricing. Many cities outsource both the roadside and back-office solutions to vendors, but retain administrative oversight. New York's future program, London's current program (overseen by Transport for London, or TfL), and Singapore's long-running program (overseen by the Land Transport Authority) all will, or currently, administer their program and oversee contractors directly. This structure allows them direct control of implementation and operation, but more importantly allows them to retain direct financial control over costs and revenues.



**Figure 6** Screenshot of TfL's Pay to Drive in London Mobile App

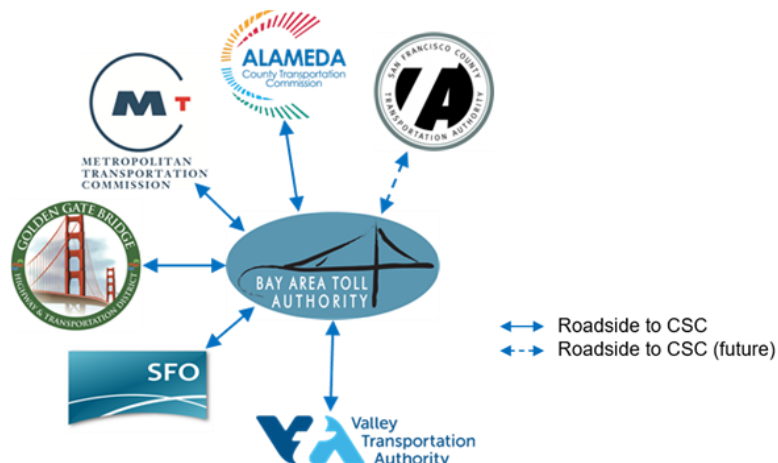
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<sup>6</sup> Oregon Department of Transportation. OReGO Local RUC Pilot.  
<<https://www.oregon.gov/odot/Programs/Pages/OReGOPilot.aspx>>

Perhaps most relevant for the City of Mountain View are the different administrative models used by Bay Area regional partners. The relationships among Bay Area tolling operators and BATA are described below and shown in Figure 7.

- **Directly managing roadside vendor:** Both Santa Clara and Alameda counties procured their own roadside Express Lanes system vendor, as they were the first agencies in the region to implement Express Lanes and BATA's bridge toll program was sufficiently different enough that leveraging that program did not make sense. At that time, the Golden Gate Bridge was also managing a separate roadway system vendor, separate from BATA's bridge toll program. This approach required agencies to staff not just for implementation, but also for long-term operations. Alameda County just recently decided to contract vendor oversight and operations to BATA instead of continuing in-house.
- **Contracting roadside vendor through a regional partner:** Contra Costa County contracted BATA/Bay Area Infrastructure Financing Authority (BAIFA) to oversee their roadside vendor in 2014. Since then, BATA/BAIFA has been contracted to operate future Express Lanes for San Mateo and Solano counties. These counties decided to leverage BATA staff and realize savings through economies of scale by using the same roadside vendor. An alternative would be partnering with Santa Clara Valley Transportation Authority and leveraging their express lanes tolling program experience and toll system vendor.
- **Contracting with BATA CSC:** All Bay Area toll operators use BATA's back office, also known as the FasTrak CSC (Figure 7). This unified arrangement reflects the region's desire for a centralized place where Bay Area customers can manage FasTrak accounts, get transponders, make payments, and resolve violations. In some cases, California state tolling authorization for Bay Area toll operators *requires* use of the BATA CSC; authorization for City of Mountain View's congestion pricing program may also require this. The City could pursue its own CSC to have more flexibility in managing the customer electronic payment experience, but this approach would likely significantly increase costs for the City and could complicate technical interoperability with other tolling systems in the region.

**Figure 7 Bay Area Toll Operators' Relationship to BATA-Operated Centralized CSC**



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The answer to the question of whether to directly manage a congestion pricing program or contract through BATA is based largely on Mountain View's desire to minimize administrative overhead, operate the program as efficiently and effectively as possible, and maintain close local control. These considerations are illustrated in Figure 8.

**Figure 8 Congestion Pricing Contracting Ease of Implementation Matrix**

<b>Ease of Implementation Criteria</b>	<b>Roadside Vendor</b>		<b>Back Office</b>	
	<i>Directly Managing</i>	<i>Contracting through Regional Partner</i>	<i>Directly Managing</i>	<i>Contracting through BATA</i>
Administrative Overhead	Significant investment in administrative staff needed by Mountain View	Limited investment in administrative staff needed; BATA/BAIFA/VTA handles most of this	Significant investment in administrative and customer service staff needed by Mountain View	Limited investment in administrative staff needed and no customer service staff needed; BATA handles most of this
Financial Efficiency	Mountain View retains most control over program costs and revenues but may not administer program as efficiently as a regional partner	Regional partner likely to administer program more efficiently than Mountain View but charges the City for operations	Mountain View retains most control over program costs and revenues but may not administer program as efficiently as a regional partner	Regional partner likely to administer program more efficiently than Mountain View but charges the City for operations
Vendor Management	Steep learning curve if Mountain View administrative staff are not experienced in tolling systems	A regional partner more experienced in overseeing tolling operations and vendors	Steep learning curve if Mountain View administrative staff are not experienced in tolling systems	A regional partner would be more experienced in overseeing tolling operations and vendors. Existing CSC has functioned well for many years
Local Control	Local control is greatest under this option, as bureaucracy involved in potential program changes is more limited	Local control slightly diminished as bureaucracy must be navigated to implement potential program changes	Local control is greatest under this option, as bureaucracy involved in potential program changes is more limited	Local control slightly diminished as bureaucracy must be navigated to implement potential program changes

**LEGEND**

Easiest	Moderate	Most Difficult
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## APPLYING PEER APPROACHES TO NORTH BAYSHORE

Based on peer congestion pricing deployment experiences and the ease of implementation matrix above, the following are key issues for the City of Mountain View to consider as it studies congestion pricing in North Bayshore.

### Application: Cordon Pricing

Peer congestion pricing programs with a cordon or zone-based system can be implemented relatively simply using AVI and ALPR technology. The City of Mountain View should further study a blend of these technologies if it pursues congestion pricing, as they are proven elsewhere.

Because all other peer tolling facilities in the Bay Area utilize FasTrak transponders, it is likely a cordon or area pricing program in North Bayshore would also utilize FasTrak, if possible, for ease of compatibility with bridge tolls and Express Lanes in Santa Clara and San Mateo counties.

### Application: Roadside Vendor

The City of Mountain View has a choice to directly administer and operate a roadside tolling system, or work with regional partners that could procure and operate a system on the City's behalf. Peer tolling programs in the Bay Area have operated in both such fashions. Because zone-based congestion pricing is new to the Bay Area, the City will need to weigh outsourcing oversight to another agency against retaining more direct control and hiring more staff to support the program. To better understand this trade-off, the City may want to coordinate with the San Francisco County Transportation Authority, which is also currently studying congestion pricing.

### Application: Customer Service Center Vendor

The City of Mountain View should carefully consider the pros and cons of utilizing the BATA CSC in a potential future congestion pricing implementation. Given regional peer tolling program's clear preference for a single place for customers to manage their toll accounts, it is possible that tolling authorization requires the City to utilize the BATA CSC; this would make customer service interactions more streamlined for customers and may make the system more efficient for the City of Mountain View.

### Application: Regional Technology Integration

The City of Mountain View should continue to engage regional partners to gauge their interest in helping the City administer a pricing program, understand regional tolling policies, and meet customer experience expectations. This engagement will also allow the City of Mountain View to be aware of regional partners' technology vendor procurement timelines, which would be valuable if the City would like to partner for new systems.

## Application: Parking Pricing

Dynamic parking pricing is used in many peer communities but faces several challenges for use as a formal congestion pricing program. Although parking pricing technologies could easily support congestion pricing, it is unknown in North Bayshore how many private off-street parking areas have access control and payment systems that could be leveraged in a congestion pricing implementation. Implementation would be difficult and costly if new equipment needs to be installed and multiple different parking systems need to be modified. The political and legislative landscape of Mountain View's influence on private parking also poses a challenge for implementation of this type of program.

## KEY STUDY QUESTIONS FOR NORTH BAYSHORE

Understanding the ever-evolving landscape of road tolling technology and administration will be crucial for the City of Mountain View as they study a potential future congestion pricing program in North Bayshore. To be sure the City is receiving all information needed to make good decisions, the following additional study questions should be revisited throughout the current study and during any future potential program design, implementation, or review.

- To what extent does the City of Mountain View want to be a **lead “innovator” in congestion pricing technology** implementation? Does it want to use reliable, legacy technology or explore new and emerging tools?
- How much **direct control** is the City of Mountain View willing to cede to regional partners in the name of efficiency and/or cost savings? Does Mountain View want to be involved in the day-to-day operations of a congestion pricing program?
- How will the City of Mountain View stay engaged with regional tolling partners to ensure **technological and customer service interoperability**?
- How can the City of Mountain View leverage **parking pricing** as a component of—or wholesale approach to—a congestion pricing program?