Attachment 3b

North Bayshore Congestion Pricing Feasibility Study

Final Report

NOVEMBER 2021

Public Draft

CITY OF MOUNTAIN VIEW

Acknowledgements

City of Mountain View

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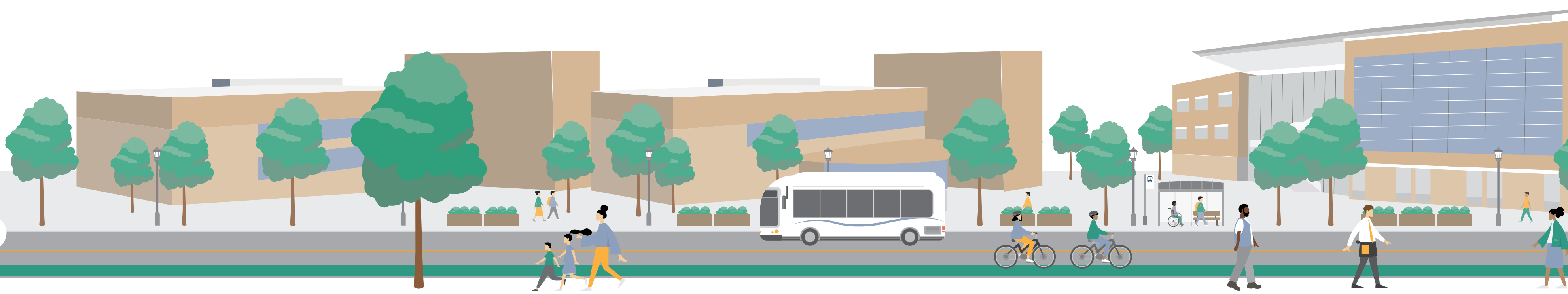
Name Goes Here
Name Goes Here

Consultant Team

Nelson\Nygaard Consulting Associates
Sam Schwartz
Silicon Transportation Consultants



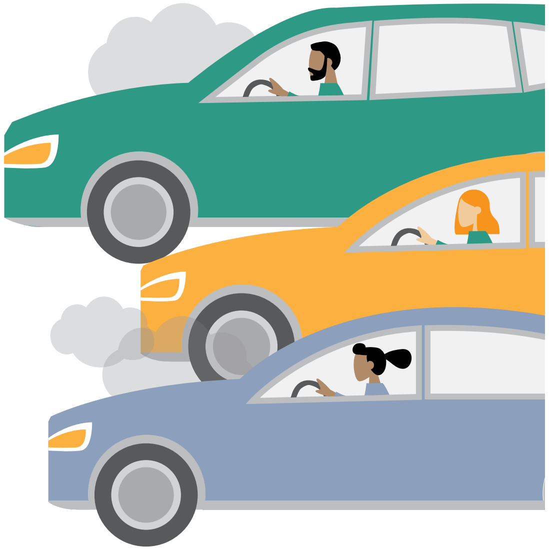
Contents

1

1 Study Overview

The *North Bayshore Precise Plan* defined a multimodal vision for the district, recognizing that its growth and transformation is only possible if the city and district stakeholders change travel behavior and make significant investments to reduce peak period congestion. The Precise Plan includes a package of policy, programmatic, and infrastructure strategies for reducing congestion. Congestion pricing was included as a measure to explore further.[1]

> **“If the employer TDM program requirement does not reduce the number of vehicle trips to less than the established a.m. peak period vehicle trip cap, the City may implement a congestion pricing system.”**
>
> *2017 North Bayshore Precise Plan*



While progress has been made to advance the Precise Plan goals and meet its mode share targets, congestion at the North Bayshore gateways continues to be a challenge. In spring 2020, just prior to the COVID-19 pandemic lockdown, roadways into and out of North Bayshore were nearly at their estimated capacity, with traffic queues persisting for over three hours and a half-mile in distance. While the long-term impacts of COVID-19 on commuting remain unknown, this study assumes a 'conservative' position, in which employee travel patterns approximate pre-pandemic conditions within two decades.

Because this congestion threatens the economic health and long-term vitality of the district, the City of Mountain View initiated the North Bayshore Congestion Pricing Feasibility Study (NBCPFS or "study") in spring 2021. This study explores the feasibility of congestion pricing as a strategy to reduce traffic, achieve the vehicle trip caps at the North Bayshore district gateways, support economic growth, and incentivize multimodal travel.

This study is a **first-phase feasibility study** that outlines the general details of a feasible congestion pricing program. This study does not include detailed traffic analysis, engineering, or program design, nor agreements with regional agencies to implement a program. If the City of Mountain View advances a congestion pricing program in North Bayshore, additional analysis, planning, design, and implementation work would be necessary before a congestion pricing program could become operational.

Study Area

This study's definition of the North Bayshore district is bounded by U.S. 101 to the south, Stevens Creek to the east, San Francisco Bay to the north, and San Antonio Road to the west (Figure 1-1). The study's three gateways are the vehicle access points for the district at San Antonio Road, Rengstorff Avenue, and Shoreline Boulevard.

Figure 1-1 North Bayshore Congestion Pricing Feasibility Study Area

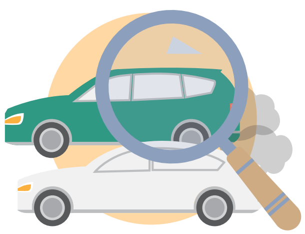
Study Context and Objectives

This study is a key complementary effort to the ongoing *North Bayshore Circulation Study*. The Circulation Study advances implementation of the *North Bayshore Precise Plan*, which was originally adopted in 2014 and was updated in 2017.

The Precise Plan identifies key metrics related to mode share and vehicle trips at the gateways. The Circulation Study is focused on the overall mobility plan for North Bayshore, including priority multimodal projects to mitigate gateway traffic impacts, reduce single-occupancy vehicle (SOV) trips, and meet trip cap requirements. The Circulation Study is coordinating closely with overall growth plans for North Bayshore and provides several key inputs for this study.

Project Objectives

The primary objectives of this study include:



Identify potential elements, costs, and benefits of a congestion pricing system in the context of the *North Bayshore Precise Plan* and trip caps.

Assess high-level feasibility of a congestion pricing program, identify the key tradeoffs of different approaches, and outline a roadmap for potential implementation.

Engage key stakeholders and the public to capture issues and opportunities related to a potential North Bayshore congestion pricing program.

Study Process

1

Goal-setting

Winter/Spring
2021

Baseline data collection, identification of key stakeholders in North Bayshore, and the development of congestion pricing program goals.

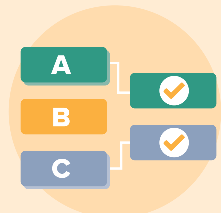
2

Brainstorm

Summer
2021

Review of best practices and lessons learned from peer congestion pricing programs and studies. We also developed four congestion pricing scenarios for North Bayshore, based on a pre-screening of appropriate program elements.

3



Analysis

Fall
2021

Technical work to evaluate the four scenarios against study goals, assess the feasibility of congestion pricing in North Bayshore, and identify a recommended scenario.

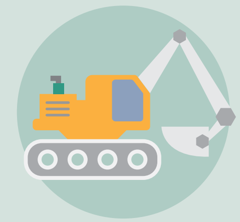
4

Document

Winter
2021

Documentation of the study's work to date, recommen-dations, and implementation roadmap.

5



Next Steps

2021 &
Beyond

If the City of Mountain View decides to implement congestion pricing, additional work will need to be accomplished before a pricing system could become operational.

2

2 State of Mobility and Congestion

The City of Mountain View and North Bayshore stakeholders have invested significant resources into implementation of the Precise Plan and its multimodal vision. This implementation is a 'living' process, evolving as the land use program takes shape, developments are approved and built, new transit services and transportation demand management (TDM) programs are implemented, and site-specific and district-wide monitoring efforts capture progress on key metrics.

This chapter describes the state of mobility and congestion in North Bayshore, non-vehicle travel options available to people entering and exiting the district, and the stakeholder outreach conducted for this study. A detailed assessment of existing conditions is in Appendix A.

Congestion in North Bayshore

There are only three ways to drive into and out of North Bayshore. The City of Mountain View refers to these roadways as the North Bayshore "gateways," and measures congestion at these locations twice each year, in the a.m. and p.m. peak periods, to assess severity of and changes in congestion over time. These gateways—San Antonio, Rengstorff, and Shoreline—are shown in Figure 2-1.

Congestion Today

The latest gateway trip monitoring occurred in spring 2020, just before the onset of the COVID-19 pandemic. The monitoring program measures the number of vehicles entering and exiting the gateways on an hourly basis and measures the mode share of travelers entering North Bayshore. The monitoring program focuses on the peak period and peak hour vehicle trip counts, which are compared to the district trip caps to monitor compliance.

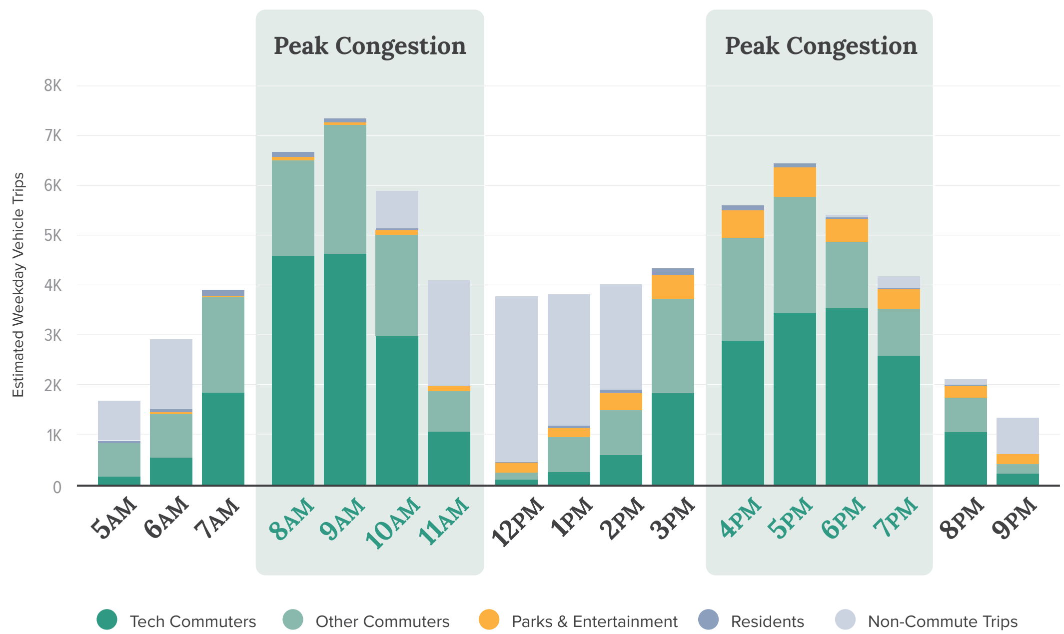
Figure 2-1 North Bayshore Gateways

Trip-Making by Time of Day and Traveler Type

Data from the monitoring program, the U.S. Census Bureau's Census Transportation Planning Products, and qualitative information gathered from stakeholder interviews inform this study's understanding of what types of travelers cross the gateways during a typical weekday (Figure 2-2). Because congestion is typically only a weekday problem in North Bayshore, this study generally considers only weekday travel.

The peak periods of congestion at the North Bayshore gateways are typically 8:00 a.m. to 11:00 a.m. and 4:00 p.m. to 7:00 p.m. During these periods, commute travel makes up the bulk of vehicle traffic, with technology employees making up most of the commuters. During the day, non-commute trips such as errands, meetings, service and sales, park use, dining, and retail make up most of the trips. Because there are very few current residents in North Bayshore, residents account for a small share of gateway congestion. Likewise, park users also represent only a minor portion of gateway congestion.

Figure 2-2 Conceptual Weekday Vehicle Trips into and out of North Bayshore, by Traveler Type



Shoreline Amphitheater

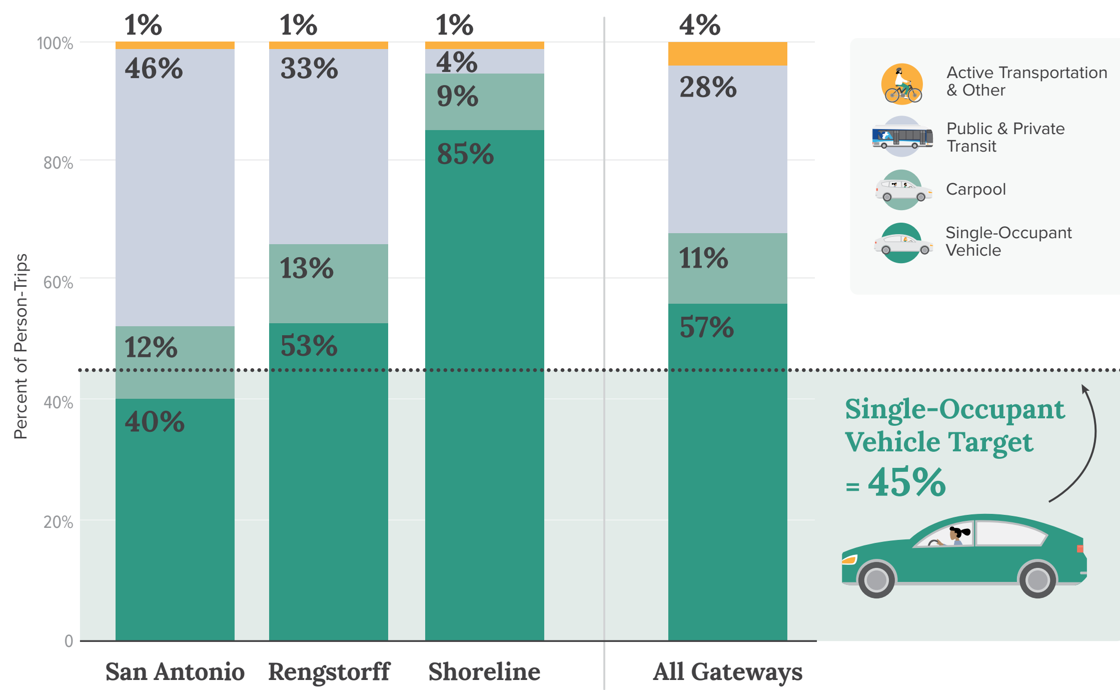
Because Shoreline Amphitheater holds periodic events, it is not considered part of the typical weekday travel patterns in North Bayshore. It is understood, however, that amphitheater event attendees can increase congestion substantially, particularly if they arrive during the p.m. peak period as commuter travel is exiting North Bayshore.

Mode Share

The primary means by which the City of Mountain View and North Bayshore stakeholders have attempted to reduce traffic congestion is through mode shift. Because of this, traveler mode share is monitored biannually in the district, at the gateway level.

Overall, 57% of all travelers are estimated to enter North Bayshore using SOVs in the peak hour (Figure 2-3). This mode share differs by gateway, primarily because of the number of employer-provided shuttle buses that access the district via each gateway. At the San Antonio Gateway, for example, where many employer-provided shuttles that originate to the north (i.e., San Francisco and the East Bay) enter the district, the SOV rate is lowest. At the Shoreline gateway, the SOV rate is highest, at 85%.

Figure 2-3 Spring 2020 a.m. Peak Hour Mode Share, by Gateway



Source: Fehr & Peers. May 2020. Spring 2020 North Bayshore District Transportation Monitoring and Near-Term Growth Assessment. <https://www.mountainview.gov/civicax/filebank/blobdload.aspx?BlobID=32463>

Queuing

Traffic backups (also known as "queuing") are one of the most tangible symptoms of congestion in North Bayshore. This queuing occurs primarily at the Rengstorff and Shoreline gateways. In the morning, these queues can persist for over three hours and extend as far south as the SR 85 off-ramps to U.S. 101. In Mountain View, the Shoreline Boulevard a.m. queue can extend as far south as Middlefield Road (Figure 2-4).

Figure 2-4 Peak Period Queuing

Source: Adapted from Spring 2020 North Bayshore District Transportation Monitoring and Near-Term Growth Assessment. p. 34. <https://www.mountainview.gov/civicax/filebank/blobdload.aspx?BlobID=32463>

Historic Congestion Growth

Congestion is not a new problem. Prior to the COVID-19 pandemic, vehicle miles traveled (VMT) had been increasing in Santa Clara County and the Bay Area since 2010, with a major increase beginning in 2015 (Figure 2-5). Likewise, vehicle hours of delay (VHD, a standard measure of traffic delay) had increased steadily since 2010, with major increases also beginning around 2015 (Figure 2-6). After the COVID-19 pandemic, these trends reversed. There remains considerable uncertainty around future VMT and VHD trends in a post-COVID world.

Figure 2-5 Annual VMT Growth on State Highways, Indexed to 2010

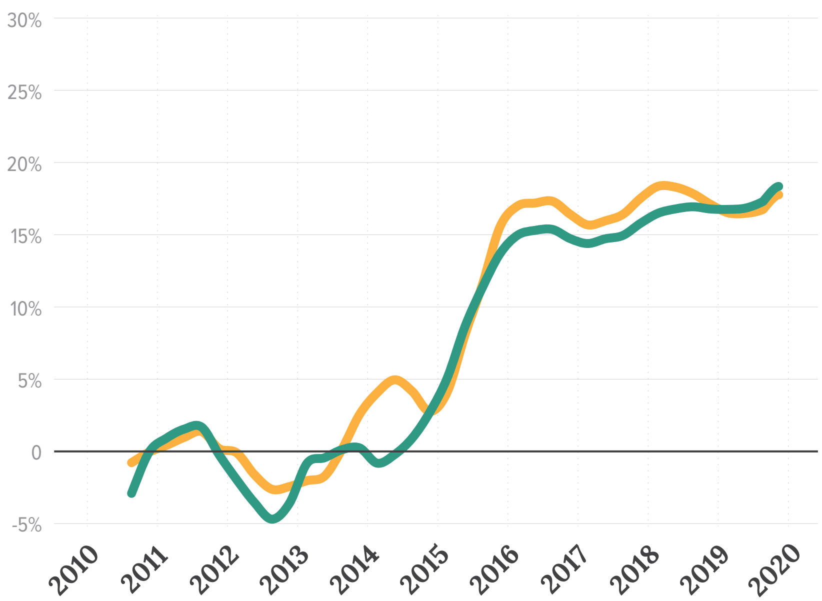
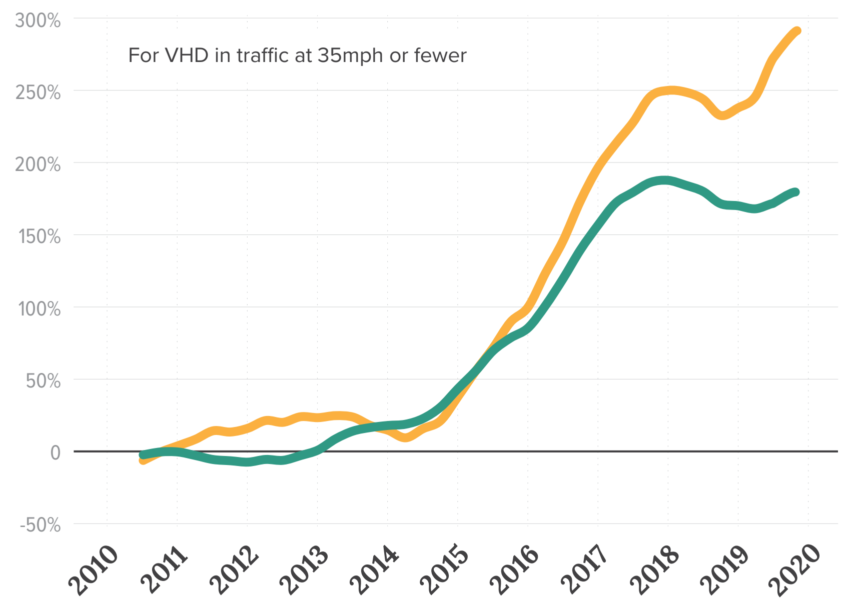
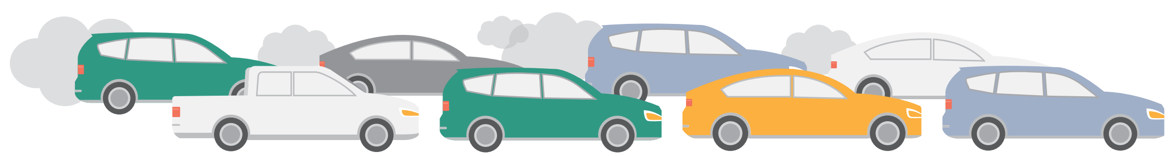


Figure 2-6 Annual VHD Growth on State Highways, Indexed to 2010



Santa Clara County
Bay Area

Source: Caltrans, 2021. Performance Measurement System (PeMS) Data Source. <https://dot.ca.gov/programs/traffic-operations/mpr/pems-source>



Traffic volumes have also grown in North Bayshore, where the number of peak hour vehicle trips has increased during most monitoring periods, by a total of nearly 400 peak hour vehicles from spring 2015 to spring 2020 (Figure 2-7).

The growth in vehicle trips at the North Bayshore gateways has been slowed by strong TDM programs undertaken by some of North Bayshore's largest employers, including Microsoft, Intuit, and Google. From spring 2015 to spring 2020, despite growth in the number of workers employed in North Bayshore, SOV rates have remained relatively stable (Figure 2-8).

Figure 2-7 Inbound a.m. Peak Hour Vehicle Trips Entering North Bayshore, 2015-2020

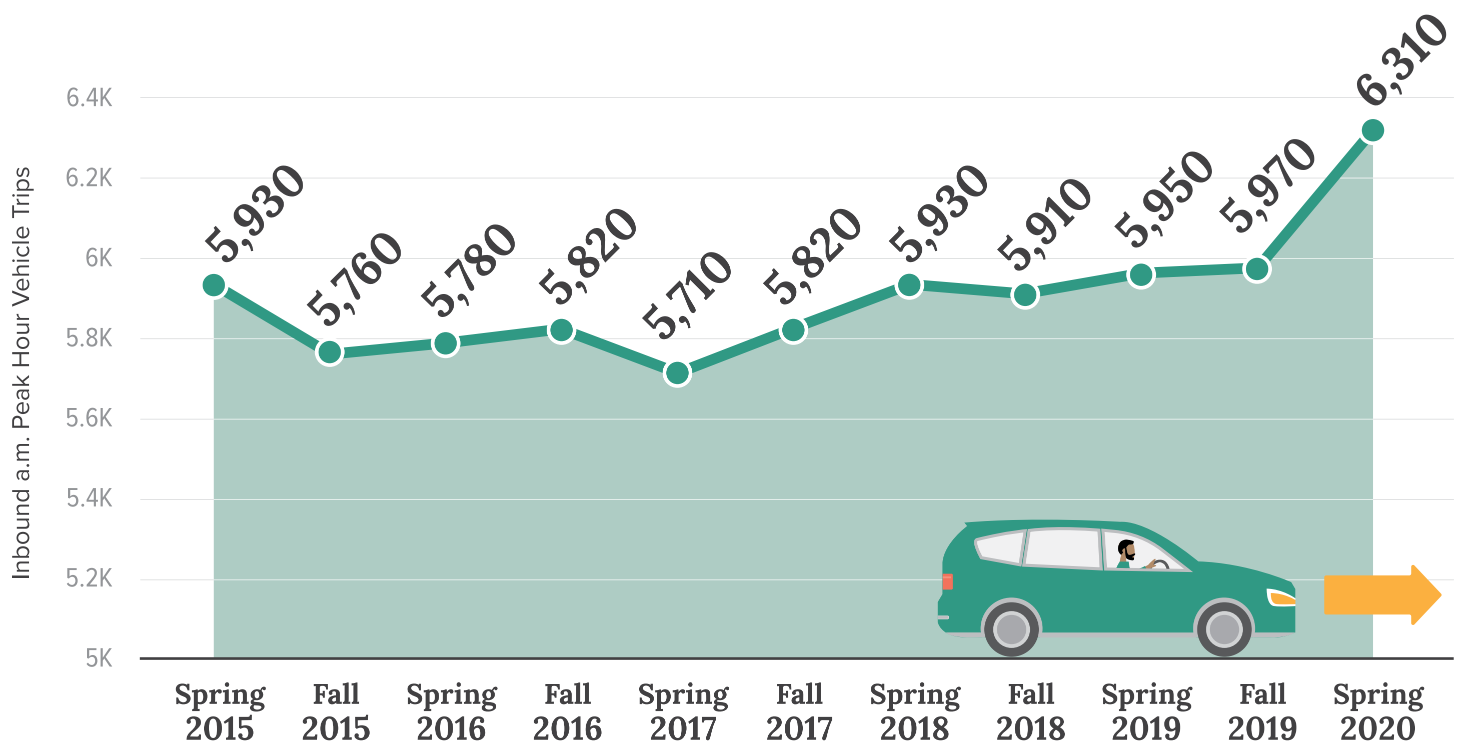
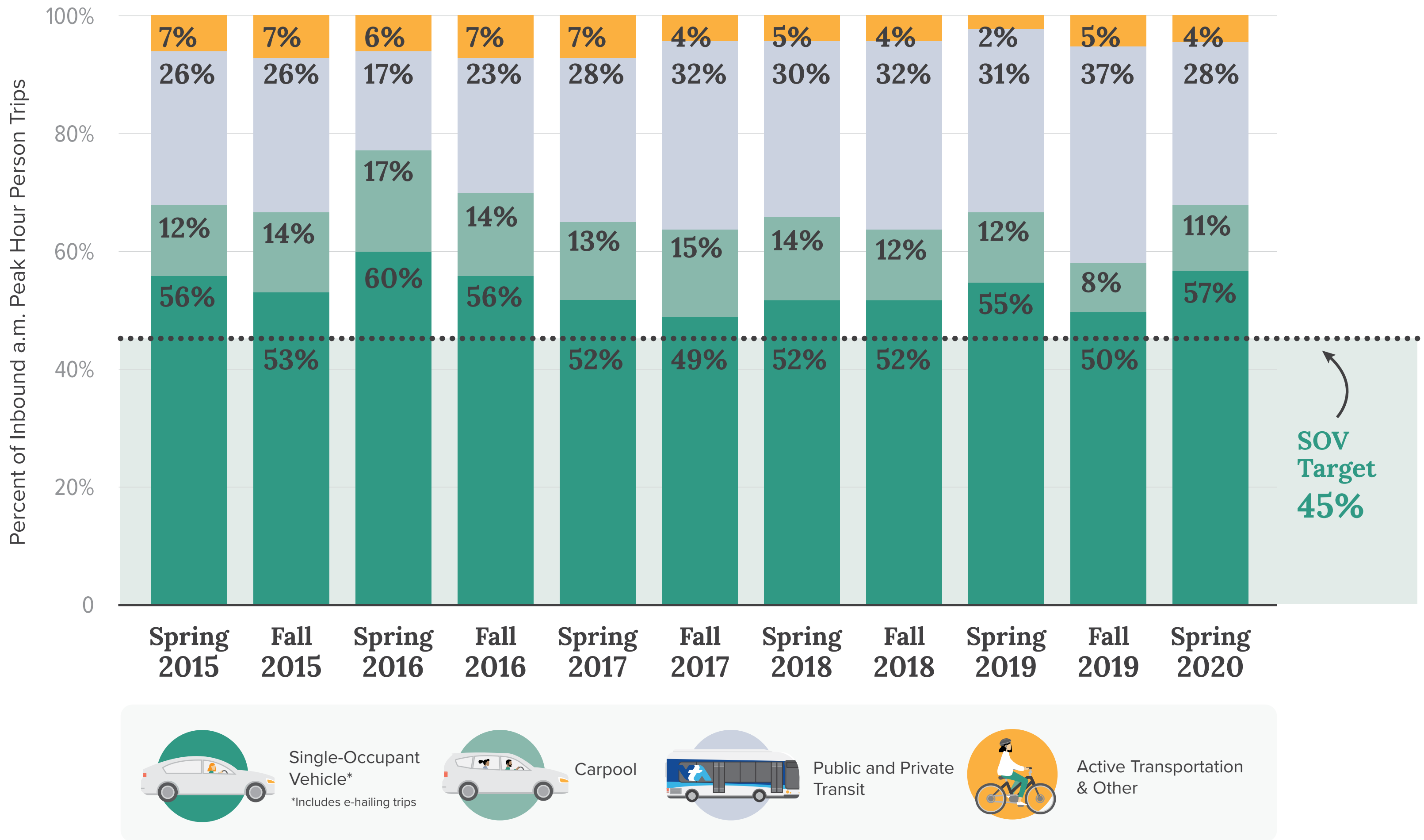


Figure 2-8 Inbound a.m. Peak Hour Gateway Mode Split, 2015-2020



Source: North Bayshore trip monitoring reports.

Congestion Tomorrow

While the long-term impacts of COVID-19 on commuting remain unknown, this study assumes a 'conservative' position, in which employee travel patterns approximate pre-pandemic conditions within the next two decades. Furthermore, because North Bayshore is planning for major residential and commercial developments in the next 10-20 years, traffic congestion in the district is projected to increase considerably if mitigation strategies are not implemented.

Figure 2-9 shows projected resident and worker growth in North Bayshore for the next 10-20 years, when nearly 17,000 more people are projected to work in North Bayshore and 10,000 residential units are planned. Without new mitigation strategies, these new residents and workers are likely to increase vehicle trips to levels above the district trip cap.

Figure 2-9 Projected Land Use and Population Change in North Bayshore

	Employees	Residents
Current (2020)	**25,800** 6.5 million sq.ft. office/R&D	**630** 360 dwelling units
Full Buildout (~2035)	**42,000** 10.5 million sq.ft. office/R&D	**18,000** 10,210 dwelling units
Growth	**+16,200 more employees** +4 million more sq.ft. office/R&D	**+17,370 more residents** +9,850 more dwelling units

Sources: City of Mountain View, proposed and ongoing development plans, and U.S. Census Bureau.

Trip Caps

Mountain View's primary traffic reduction policy and tool for North Bayshore is the trip cap. First implemented in the 2014 *North Bayshore Precise Plan*, the trip cap was refined in the 2017 *North Bayshore Precise Plan*. The trip cap limits the number of vehicle trips at the gateways, and if the cap is exceeded, mitigation measures are to be activated, including the potential implementation of congestion pricing.[2]

In 2021, City of Mountain View staff reassessed the trip cap thresholds and arrived at a recommended adjusted trip cap for the North Bayshore district (Figure 2-10). This study uses these trip caps as the target threshold under which a congestion pricing program is considered to have reduced vehicle trips to the desired level.

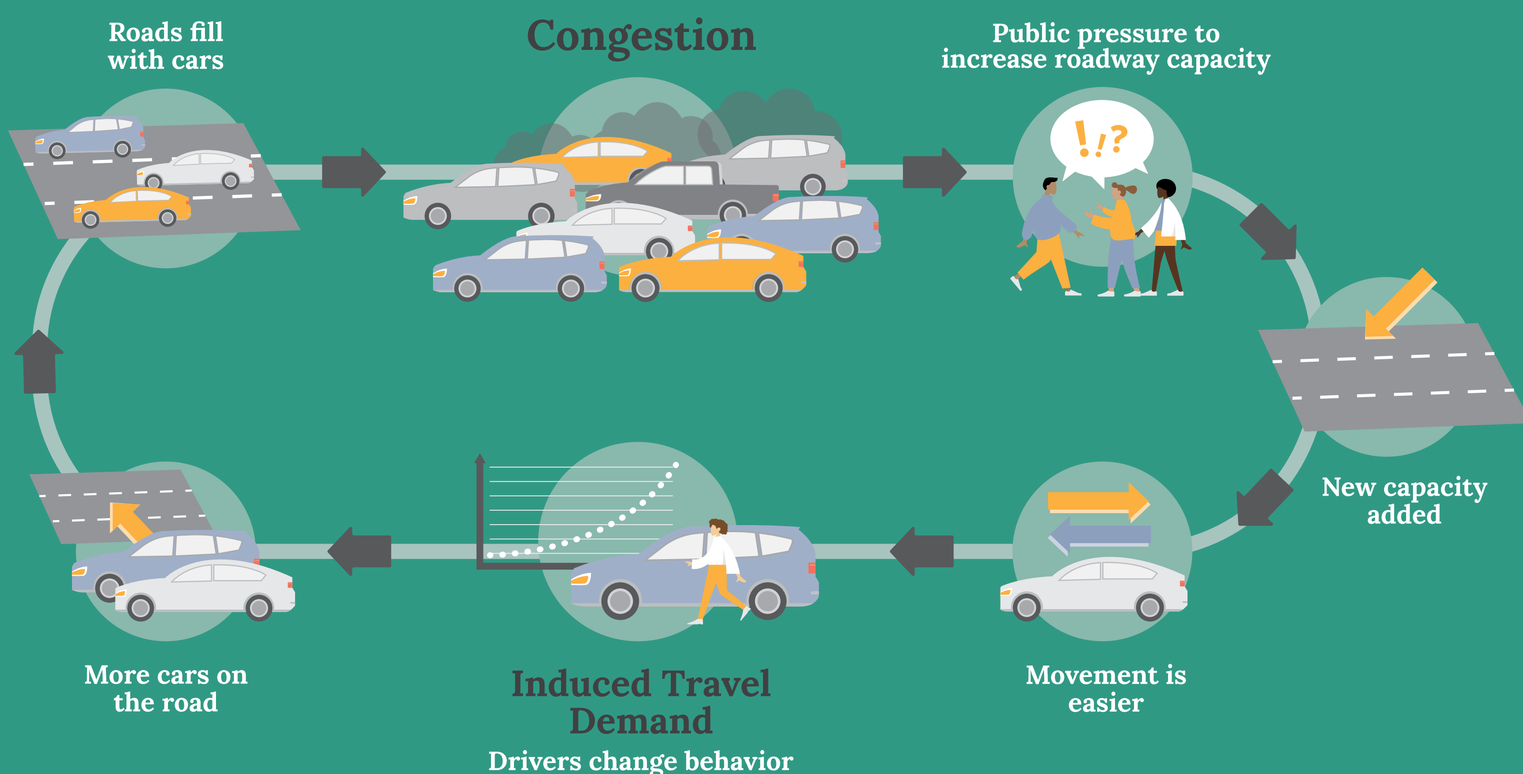
Figure 2-10 Recommended Inbound a.m. Peak Gateway Trip Caps

Gateway	Peak Hour	3-hr Peak Period
Rengstorff	2,960	8,880
San Antonio	1,530	4,590
Shoreline	2,490	7,470
TOTAL	**6,980**	**20,940**

Note: Recommended trip caps by staff as of October 2021. Not formally adopted by Mountain View's City Council, as of November 2021.
Source: Hexagon Transportation Consultants, Inc. August 9, 2021. Gateway Trip Cap Study for the North Bayshore Area in Mountain View, California. p. 2.

The Capacity Trap

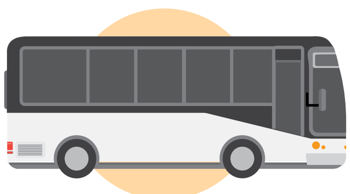
Part of the logic behind implementing congestion pricing in North Bayshore is the adopted city and community vision to find non-roadway-capacity solutions and not try to build North Bayshore out of its congestion problem. Increasing roadway capacity typically reduces congestion for a short period of time, after which land uses intensify, traffic increases, and the roadway becomes congested again. This phenomenon, which is often referred to as 'induced demand', is summarized below.



Travel Options in North Bayshore

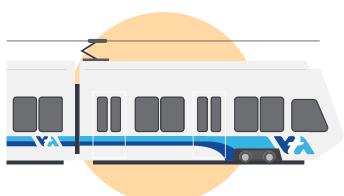
Much of North Bayshore's relatively low SOV rate can be attributed to the transit options available to travelers entering and exiting the district. These options, which are expected to become more robust as development in North Bayshore increases, are summarized below and in Figure 2-11.

Transit



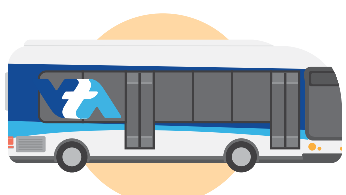
Employer-Provided Bus

The employer-provided commuter bus is the most well-used form of mass transportation in North Bayshore. All three major district employers (Google, Intuit, and Microsoft) provide this service, serving an estimated 8,000 average weekday boardings prior to COVID-19.



Regional and Light Rail

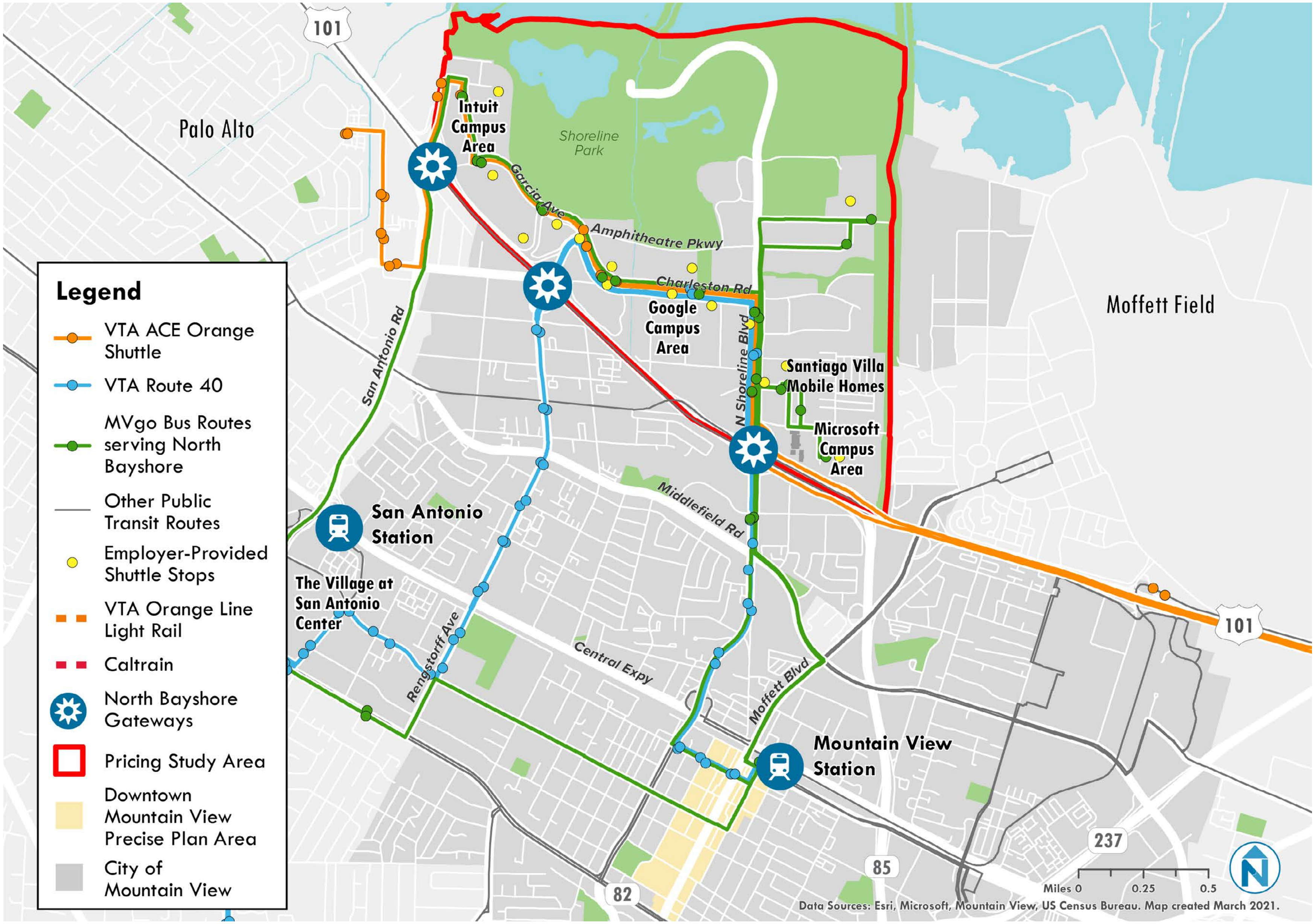
Three rail lines provide access to and from North Bayshore: Caltrain commuter rail, Altamont Corridor Express (ACE) heavy commuter rail, and Santa Clara Valley Transportation Authority (VTA) light rail. Although none of these services enter North Bayshore, public and private bus connections are available, notably from the proximate downtown transit center.



Public Bus

Several public bus services are available in North Bayshore, including ACE shuttle buses, VTA Route 40, MVgo shuttle buses, and the Mountain View Community Shuttle. Many of these bus services provide direct connections to rail stations and residential communities outside North Bayshore. Prior to COVID-19, about 2,000 average weekday boardings to and from North Bayshore were on public bus service.

Figure 2-11 Existing Transit Services



Active Transportation

Biking and walking connections to North Bayshore are provided by the local roadway network and several local and regional shared-use paths (Stevens Creek and Permanente Creek trails). The commute/access shed of people walking and biking to the district is limited due to the low-density nature of the communities immediately surrounding North Bayshore, wide and fast-moving arterials, major barriers (highways and the rail corridor), and limited sidewalks and separated bike lanes. New biking and walking connections are planned or in development (Figure 2-12).

Figure 2-12 Existing and Planned Active Transportation Network

Other Mobility Programs

The Mountain View Transportation Management Association (MTMA)—a non-profit transportation agency focused on reducing traffic congestion in the City of Mountain View—has several mobility programs that also assist with SOV trip reduction in North Bayshore.

MVgo Shuttles

The MTMA operates several shuttle routes that are free and open to all passengers. Three of these routes connect to the Mountain View Transit Center and serve North Bayshore.

Mountain View Community Shuttle

This MTMA-operated free shuttle service is a partnership between Google and the City of Mountain View, providing circulation throughout the city seven days a week. Although the route does not serve North Bayshore on weekdays, it does serve the district on weekends, providing important access to parks, retail, and other destinations.

Carpool Link

To reduce SOV commuting, the MTMA Carpool Link program provides a $5 subsidy for Waze carpool trips that begin or end in the City of Mountain View. Trips fewer than 10 miles are free.

Employer TDM Programs

The *North Bayshore Precise Plan* requires major employers in the district to maintain TDM plans that reduce SOV travel to and from their worksites. The most visible and resource-intensive program used by major employers is the free employer-provided shuttle. Other TDM measures include priority parking spaces for carpoolers, bicycle parking, lockers, and showers for bicycle commuters, subsidized or free transit passes, pre-tax commute benefit programs, rideshare matching service, and on-site transportation coordinators. Some major employers also offer free bikeshare in the district.

Priority Projects and Programs

The *North Bayshore Precise Plan* identified a suite of priority capital projects to mitigate the impacts of traffic congestion and improve access to and mobility within the district. These projects, which are planned in five-, ten-, and 20-year timeframes, were updated in 2021 as part of the *North Bayshore Circulation Study*. The following tables and Figure 2-13 summarize these projects.

Five-Year Projects

ID	Name	Cost Estimate in 2021	Project Description
1	**Charleston Transit Boulevard, Phase 2/3**	$43.4M	Transit boulevard, including bus lane in both directions, two-way cycletrack on north side and one-way protected bike lane on south side. Limits: Huff Avenue to Salado Drive. Google will fund added turn lanes (not in budget).
2	**Plymouth/Space Park Connection**	$59.5M	Realignment of Plymouth Street to provide connection with Space Park Way at Shoreline Boulevard; create new signalized intersection with two northbound left turns. Project includes utility relocation. Google reimbursement for second left turn and widening of Plymouth Street not included in funding.
3	**U.S. 101 Bike/Pedestrian Bridge at Shoreline**	$29.0M	Pedestrian and bicycle bridge across U.S. 101 and cycle track from Terra Bella Avenue to Pear Avenue. Includes contingency and cost escalation.
4	**U.S. 101 Shoreline NB Off-Ramp**	$31.4M	Realignment of U.S. 101 northbound off-ramp connecting to La Avenida Street; includes bus lane on ramp and consolidated signalized intersection at Shoreline Boulevard.
5	**Shoreline Corridor Bus Lane**	$22.1M	Reversible bus lane, protected one-way bike lanes south of Terra Bella Avenue, protected intersections, and northbound right turn lane at Pear Avenue.
6	**Frontage Road from Landings Drive to Permanente Creek**	$3.4M	Match for Frontage Road improvements adjacent to the Landings project; Google to provide equal amount for their share of project.
7	**Transit Center Upgrades, including Grade Separation and Access Project**	$5.0M	Project elements that benefit North Bayshore, including shuttle stops, bike connections to Shoreline corridor.
8	**Congestion Pricing Implementation**	TBD	Construction elements for implementation if program is approved. See Chapter 6 for initial cost estimates.

Ten-Year Projects

ID	Name	Cost Estimate in 2021	Project Description
9	**Shoreline Corridor Cycletrack (North of Plymouth)**	$14.9M	Extends cycle track on west side from Plymouth Street to Charleston Road; create protected intersection at Shoreline Boulevard at Charleston Road; may require right-of-way (RoW) from Google and non-Google property.
10	**Bus Lane Extension from Plymouth/Space Park to Charleston**	$3.7M	Extend reversible bus lane from Plymouth Street to Charleston Road; converts current median to bus lane.
11	**Frontage Road Extension from Permanente Creek to Plymouth**	$37.6M	New Permanente Creek bridge with two auto lanes plus protected bike lanes and sidewalks; roadway connection to Plymouth Street (access street).
12	**Rengstorff to Landings Drive (new roadway connection from interchange to frontage road)**	$37.7M	New roadway connection to Landings Drive from Rengstorff interchange; includes RoW on parcel east of Rengstorff Avenue (parking impact only).
13	**U.S. 101 Rengstorff Ramp Realignment**	$16.5M	Realign northbound U.S. 101 at Rengstorff Avenue off-ramp to new signalized intersection; VTA-led project now completing Caltrans Project Initiations Documents phase; possibly grant-funded with City match; interchange project only.
14	**Bus Lane Enhancements**	$4.1M	Add new bus-only connector ramp from bus lane to U.S. 101 on-ramp (southbound p.m. bus lane trips only); include queue jump phase for bus lane at U.S. 101 southbound ramp at Shoreline Boulevard.
15	**Stevens Creek Trail Connections**	$0.8M	Permanent ADA-compliant trail connection to Stevens Creek Trail from Class I path near retention basin; other connections at Charleston Road or future extension of Space Park Way developed through Google Master Plan.

Source: City of Mountain View. June 8, 2021. City Council Report Attachment 2: Priority Transportation Projects – 2021 Update. pp. 2-4. <https://www.mountainview.gov/civicax/filebank/blobdload.aspx?BlobID=35681>. Note that table has been updated slightly by City of Mountain View Staff since citation was produced

20-Year Projects

ID	Name	Cost Estimate in 2021	Project Description
16	Garcia: CRAG to Bayshore and San Antonio	$3.1M	Add cycletracks or class IV bike facilities.
17	Rengstorff: CRAG across U.S. 101 to Leghorn	$12.5M	Add class IV bike facility and sidewalks on both sides; requires bridge replacement.
18	San Antonio: Bayshore to U.S. 101	$12.5M	Add class IV bike facility and sidewalks on both sides; requires bridge replacement.
19	Amphitheater: Shoreline to CRAG	$6.4M	Expand portion to four lanes; extend cycletrack on south side only.
20	Stevens Creek Bike/ Pedestrian Bridge at Charleston	$22.8M	New bicycle and pedestrian bridge across Stevens Creek with connecting paths to Charleston Road and NASA roadways; assumes ~20' width.
21	La Avenida Bike/ Pedestrian Bridge Connection	$25.6M	Bridge over Shoreline Boulevard to La Avenida Street, connecting to Shoreline Bike/ Pedestrian Bridge

Source: City of Mountain View. June 8, 2021. City Council Report Attachment 2: Priority Transportation Projects – 2021 Update. pp. 2-4. <https://www.mountainview.gov/civicax/filebank/blobdload.aspx?BlobID=35681>. Note that table has been updated slightly by City of Mountain View Staff since citation was produced

Figure 2-13 North Bayshore Priority Transportation Improvements, 2021 Update

Stakeholder Outreach

This study conducted targeted outreach to gather initial feedback from North Bayshore stakeholders and the community. Major components of the outreach included two rounds of stakeholder interviews, two workshops with city staff from multiple departments, and a briefing with City Council. Feedback and key themes are summarized below.

Stakeholder Interviews

In addition to the quantitative data reviewed during baseline congestion analyses, two rounds of stakeholder interviews were conducted by the study team. The first round of interviews provided important qualitative information on how stakeholders perceived congestion, how it impacted their recreational, shopping, business, and other travel activities in North Bayshore, and how it may impact future development in the district. The second round of interviews focused on the program scenarios, evaluation results, and a discussion of pros and cons for each scenario.

The following stakeholder groups were identified and interviewed by the study team:

- Affordable housing developers
- City of Mountain View Athletic Fields
- Computer History Museum
- Major employers (Google, Microsoft, Intuit)
- MTMA
- Real estate developers
- Santa Clara VTA
- Santiago Villa Neighborhood Association
- Shoreline Amphitheater
- Shoreline Park
- Small businesses

Key Findings from Stakeholder Interviews

Round 1

Stakeholders were universally frustrated by traffic in North Bayshore, although different stakeholders **experienced different negative impacts of congestion.**

- Large employers in the district thought congestion impacted North Bayshore's attractiveness as a workplace and made it more difficult to conduct campus planning.
- People living in the district reported that traffic congestion limits their mobility, especially during the peak periods.
- City of Mountain View parks employees change their working hours to avoid travel during the peak periods.
- VTA buses take longer to return to the North Base, which is located in the district. This increases operating costs for VTA.
- Shuttles operated by the MTMA are delayed by traffic congestion, reducing the speed and reliability of their services.

“We're concerned about traffic but we don't want congestion pricing to make North Bayshore **a less attractive place for people to work.**

We're concerned about the **potential financial impact of congestion pricing** on our lower-paid contract workers.

If congestion pricing were implemented, we might **reimburse our full-time employees** for the charge.”

Major Employers

Several stakeholders expressed **concern about the potential implementation of congestion pricing**, for reasons related to a post-COVID world and their business' success, equity, and fairness.

- Large employers in the district were concerned that congestion pricing would make commuting to the district more expensive for their workers and a less attractive workplace. These companies were also concerned about the potential impacts on low-wage contract workers, who generally are not included in corporate TDM benefit programs, and for whom a congestion charge may be disproportionately burdensome.
- Large employers also emphasized that long-term commute patterns and work-from-home rates are hard to predict because of COVID-19. The 'new normal' will have substantial impacts on gateway congestion and the need for congestion pricing.
- Santiago Villa mobile home community residents believed it would be fair if they received an exemption from congestion pricing because they must use the district gateways to travel to and from their homes.

“Because we live in the potential pricing area, we have no choice but to pay the charge. **It would be fair to provide us an exemption.**”

Santiago Villa Mobile Home Community

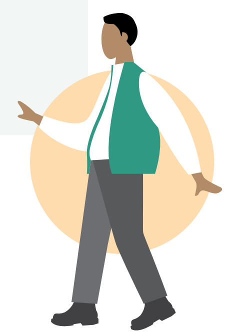
“Our employees have **adjusted their schedules** so they don't have to sit in traffic.”

Parks

“**Our shuttles get stuck in traffic,** making them less competitive than driving.

Revenue from congestion pricing could help support our programs and services.”

Mountain View Transportation Management Association



- Small business owners in North Bayshore were worried a congestion charge would make it hard to attract workers, as many of their employees do not earn high wages. Some business owners were worried the added cost for customers driving to their business would push those customers to shop elsewhere.
- Real estate developers in North Bayshore were concerned that a congestion charge would make it more difficult for them to build and rent properties, especially ground-floor retail that might depend on customers who drive.

The **MTMA was interested in congestion pricing as a potential tool to support their mission to reduce vehicle trips.** They also recognized the potential value of investing net revenue from the program into projects, services, and programs that reduce peak period SOV trips.

“We’re concerned about traffic but don’t want congestion pricing to **drive our customers to nearby competitors.**

Many of **our employees are low-income** and a congestion charge would be a hardship for them.

We’d like to see the City of Mountain View try to mitigate traffic problems with **other tools first,** such as by re-timing the traffic lights.

Big tech companies are causing the congestion, so why not just charge them?”

Small Business

“We are hoping to **develop mixed-use properties in North Bayshore that will reduce overall trips,** because people will be able to work, shop, and play where they live.

We are concerned congestion pricing could make it **challenging for us to lease commercial and residential** space in North Bayshore.”

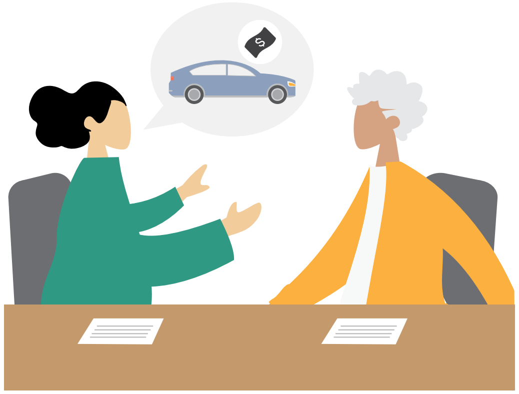
Developers

Round 2

- Major employers in the district remained concerned about congestion pricing's potential impact on their **ability to attract and retain employees**, as well as the potential **hardship** a congestion charge may place on their **lower-paid contract workers**. Some employers saw the value in congestion pricing as a tool to ensure **real estate development could continue** in North Bayshore without exacerbating traffic congestion and greenhouse gas emission problems cause by SOVs.

- Major employers also reiterated the sustained changes COVID-19 has had on commuting patterns, noting that **many employees still work from home** and hybrid work arrangements will likely continue indefinitely. The reduced number of employees on campus could have a long-term impact on gateway congestion and the need for congestion pricing.

- Some stakeholders continued to express concerns about the increased cost of accessing North Bayshore during pricing hours, and how that might make certain retail- or service-based business **less attractive, relative to nearby unpriced competitors**.



- The **Computer History Museum** reported that a significant portion of its revenue is earned from event space rentals and was concerned that congestion pricing could jeopardize rental revenue.

- VTA was briefed on the project and highlighted their desire for robust and consistent engagement if the City decides to move forward with a more detailed congestion pricing study. VTA emphasized that substantial additional study is needed, and they have not agreed to any partnership as part of this study. Another key priority for VTA is ensuring **consistent business rules across any potential future congestion pricing programs and regional toll facilities**.

City of Mountain View Staff Workshops

The study team held two workshops with City of Mountain View staff from the Community Development and Public Works departments. In both workshops, staff expressed their goals for and concerns with congestion pricing, shared key considerations related to traffic congestion in North Bayshore, and helped define the study's goals. These workshops provided valuable exposure of city staff to congestion pricing concepts and informed the development of initial congestion pricing scenarios for evaluation.

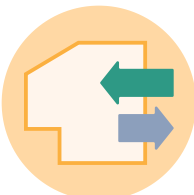
3

3 Congestion Pricing Basics

Congestion pricing is a traffic congestion reduction tool that typically establishes a fee for driving into or within specific areas during the most congested times of day. Congestion pricing has been implemented throughout the world and is being studied in several major metro areas in the United States, including San Francisco, Seattle, Portland, New York, and Washington, D.C. Peer review white papers developed for this study are in Appendix B1 through B3.

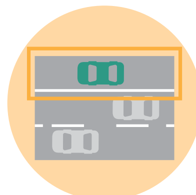
Types of Congestion Pricing

Congestion pricing can take different forms. Some common forms of congestion pricing are:



Cordon Pricing

Vehicles pay a fee when they cross a boundary *into or out* of a specific zone. This type of pricing is used in Stockholm, Sweden.

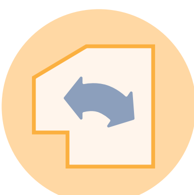


Corridor Pricing

Vehicles pay a fee when they use a *designated segment of a roadway or freeway*. This type of pricing is already used in the Bay Area on the I-580, I-680, and SR 237 Express Lanes.

Fleet Pricing

Certain *vehicle types*, such as heavy-duty trucks or ride-hailing vehicles, pay a fee to drive in a specific zone. This type of pricing is used in Seattle, WA and New York City, NY.



Area Pricing

Vehicles pay a fee for driving *inside* a specific zone. This type of pricing is used in London, England.

VMT Pricing

Vehicles pay a fee based on the *distance they travel* in a certain zone. This type of pricing is being piloted in several states, such as Oregon and California.

Benefits of Congestion Pricing

Congestion pricing, when paired with improved transit and non-auto mobility options, has been shown to reduce traffic. Other typical benefits include:

Faster transit: As traffic is reduced, buses move more quicky, making transit more attractive and competitive with driving.

Reduced pollution: When traffic is reduced, so are the emissions and noise produced by vehicles.

Increased revenue: Net revenue can be invested in all types of transportation improvements, including public transit, bike lanes, sidewalks, and road repairs.

Safer roads: Some studies have shown that congestion pricing reduces crashes in the priced area.

Challenges of Congestion Pricing

Like any transportation program, implementing congestion pricing comes with a unique set of challenges. Some of the most significant barriers to implementation of a successful congestion pricing program are:

Equity: Congestion pricing should be designed in an equitable fashion to avoid disproportionate and inequitable outcomes for disadvantaged community members.

Privacy: Congestion pricing may involve a combination of cameras and technology to read license plates and transponders. Any program that collects this type of data, such as the Bay Area's Express Lanes and bridge tolls, requires careful safeguarding of personal information.

Administration & Technology: Developing an advanced, resilient, and interoperable congestion pricing system is challenging and requires planning, engineering, and government cooperation.

Congestion Pricing Case Studies

Congestion pricing has been in operation in several overseas cities for decades, including:

- **London, United Kingdom,** where an area pricing system has operated since 2003.
- **Milan, Italy,** where a cordon pricing system began operating in 2008.
- **Singapore,** where a corridor pricing program has operated since 1998.
- **Stockholm and Gothenburg, Sweden,** Sweden, where cordon pricing programs have operated since a 2005 Stockholm pilot and in Gothenburg since 2013.

Figure 3-1 Congestion Pricing Programs and Studies

Despite the success of overseas programs, cities in the United States have yet to adopt a formal congestion pricing program. Although many major cities in the United States have begun to study congestion pricing in the past five years, only New York City has an approved program, which is currently being designed. Other cities in the United States that are considering congestion pricing are shown in Figure 3-1.

Issue Spotlight

Equity

Several existing congestion pricing programs provide discounts and exemptions for the charge based on vehicle and traveler characteristics, such as congestion pricing zone residential status, income status, or vehicle type. Discounts and exemptions from peer congestion pricing programs and New York City's planned program are shown in Figure 3-2.

Figure 3-2 Congestion Pricing Program Discounts and Exemptions

	Base Charge	Exemptions	Discounts
London	**£15 ($20.39)** same day or advance **£17.50 ($23.79)** up to three days after travel	Emergency vehicles, motorcycles and mopeds, vehicles used by people with disabilities, licensed taxis.	Zone residents Breakdown vehicles, vehicles with 9+ seats, vehicles that meet "clean" standards, motor tricycles, roadside recovery vehicles
Stockholm	**11-35 SEK ($1.25-$4)** in the off-peak season (max 105 SEK/day) **11-45 SEK ($1.25-$5.13)** in the peak season (max 135 SEK/day)	Motorcycles and mopeds, emergency vehicles, military vehicles, public buses, residents of an island that is only accessible through the zone.	None
Milan	**€2 ($2.31)** for zone residents **€3 ($3.47)** for vehicles parking in select garages and service vehicles **€5-€100 ($5.78-$115.55)** for other vehicles (type-dependent)	Motorcycles, emergency vehicles, vehicles used by people with disabilities, public transit vehicles, electric vehicles, public utility vehicles, taxis.	Zone residents are not charged for their first 40 entrances of the calendar year and receive a 20% discount from their 41st entrance on.
New York City	**$9 to $23** for E-ZPass users **$14 to $35** for Toll by Mail users[3]	For-hire vehicles, emergency vehicles, MTA vehicles, vehicles used by people with disabilities.	Residents of the zone with annual incomes less than $60,000.

Issue Spotlight

Finances

Operating a congestion pricing program involves balancing the capital and operating costs of a tolling operation with the community's goals for investing the program's net revenue. Often, this balancing act occurs in a congestion pricing program's charge-setting process.

Program Costs

Congestion pricing has two primary costs: capital and operating.

The **capital costs** of a congestion pricing program are the technological and physical infrastructure needed to operate a tolling system. This includes toll tag readers, automatic license plate readers (ALPRs), gantries or poles to support this equipment, and the electronic and computer infrastructure to process toll transaction data.

Operating costs are the ongoing costs to operate, maintain, and enforce a congestion pricing program. These include program staff salaries, fees paid to credit card companies and transaction processors, physical infrastructure maintenance costs, utilities, and other expenses.

Revenue Allocation

Net revenue from congestion pricing is almost always invested in transportation improvements for the priced area. In Milan, revenues are invested in sustainable mobility strategies, while in London, revenues are split among transit, road improvements, and active transportation projects. New York City's net revenue will be allocated exclusively to public transit.

Charge Setting

Determining the charge for a congestion pricing program can be one of the most challenging financial decisions for a program operator to make. Some programs, like New York City's planned congestion pricing system, set the charge to hit revenue targets that will support planned infrastructure spending. In San Francisco, the ongoing congestion pricing study is evaluating a charge that is calibrated to achieve a vehicle trip reduction goal.

Issue Spotlight

Technology and Administration

Operating a congestion pricing program involves navigating a complicated web of technological and administrative relationships.

Technology

Congestion pricing technology is like conventional highway tolling technology. It must perform two primary functions: 1) accurately and correctly charge travelers; and 2) ensure travelers make payments and obey rules. The primary technology components needed to perform these functions are:

Vehicle identification devices: This technology typically involves radio frequency identification detectors that can read toll tag transponders in and on vehicles.

Roadside detectors: This equipment is typically designed as an ALPR camera system that ensures all vehicles are identified and properly charged.

Customer service center: Customer service technologies are typically computerized equipment that 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 charge levels, and monitor performance.

Administration

Administering a congestion pricing program can be complicated, especially if the organization overseeing the program chooses to self-administer, instead of outsourcing the work to an agency with road pricing experience. Although the overseeing agency must conduct some oversight activities (e.g., accounting and contract management) in either situation, most toll facility owners choose to leverage government agencies or private contractors that specialize in roadway tolling. Essentially, a congestion pricing program must use one of two options for program administration:

Direct management: 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 is that the administering organization must have the staffing resources and expertise to procure, implement, and oversee technology vendors.

Leverage a regional pricing partner: In the Bay Area, congestion pricing programs can leverage a regional partner to manage a portion—or all—of a program's technology vendors. Besides having staff with road pricing experience, regional partners have roadside and customer service center vendors already contracted. Drawbacks of leveraging a regional partner include reduced flexibility because of having to coordinate through an additional agency to make decisions and changes, such as adjustments to pricing rules.

Tolling In the Bay Area

The San Francisco Bay Area is home to over 150 lane-miles of tolled roadways, including bridges and express lanes. Using a combination of FasTrak transponders and ALPR cameras, these facilities processed approximately 170 million toll transactions in 2019.[4] Bay Area governments with current and planned toll facilities are shown in Figure 3-3 and Figure 3-4.

Although administered separately, all Bay Area toll facilities integrate with the Bay Area Toll Authority's (BATA's) FasTrak Regional Customer Service Center (RCSC). This unified arrangement reflects the region's desire for a centralized place for customers to manage FasTrak accounts, get transponders, make payments, and resolve violations. The BATA RCSC has approximately three million accountholders with approximately four million transponders in circulation.[5]

Figure 3-3 Current and Future Tolled Bay Area Facilities

Agency	Facility
Alameda County Transportation Commission/Sunol SMART Carpool Lane Joint Powers Authority	I-580 Express Lanes I-680 South Express Lanes
BATA/Metropolitan Transportation Commission/Bay Area Infrastructure Financing Authority (BAIFA)	Antioch Bridge Benicia/Martinez Bridge Carquinez Bridge Dumbarton Bridge I-880 Express Lanes Richmond/San Rafael Bridge San Francisco/Oakland Bay Bridge San Mateo/Hayward Bridge
Contra Costa Transportation Authority	I-680 North Express Lanes*
Golden Gate Bridge Highway and Transportation District	Golden Gate Bridge
San Francisco County Transportation Authority	Treasure Island
San Mateo County Joint Powers Authority	U.S. 101 Express Lanes* ✓ PLANNED
Santa Clara Valley Transportation Authority	SR 237 Express Lanes U.S. 101/SR 85 Express Lanes ✓ PLANNED
Solano County Transportation Authority	I-80 Express Lanes* ✓ PLANNED

*Contracted or planned to be contracted through BAIFA.

Figure 3-4 Tolled Bay Area Road Facilities

Source: FasTrak. 2021. Toll Locations. <https://www.bayareafastrak.org/en/common/docs/fastrak-bayarea-fullmap.pdf>

As of September 2021.

4

4 Program Goals

Clear and transparent goals are essential to the development of a congestion pricing program. The most successful programs define a set of goals to guide both program development and ongoing implementation. Congestion pricing in North Bayshore will be a major endeavor for the city and have far-reaching impacts. This study defined a Goals Framework to anchor the feasibility analysis and articulate for the community why and how congestion pricing can best meet the overall vision for North Bayshore.

Goals Framework

This study assumes the primary goal of a North Bayshore congestion pricing program is to keep vehicle traffic into and out of the district below the gateway trip caps. Although meeting the trip cap is the overriding goal of congestion pricing, initial outreach to key stakeholders and Mountain View staff revealed several additional goals for a congestion pricing program, which were developed into a Goals Framework document.

The Goals Framework was developed in three stages.

Stage 1

The study team developed a draft framework based on key stakeholder interviews, goals from the 2017 *North Bayshore Precise Plan*, and a peer review of congestion pricing goals from several North American cities studying congestion pricing.[6] Stakeholder hopes, concerns, and visions for congestion pricing were the foundational elements of this draft.

Stage 2

The Goals Framework was workshopped with City of Mountain View staff to ensure program goals also matched Mountain View's short- and long-term strategic goals for North Bayshore.

Stage 3

A final draft of the Goals Framework was then incorporated into the scenario development and evaluation process of this study.

Goals, Principles, and Performance Indicators

Congestion pricing in North Bayshore has four goal areas. It also includes design principles to define how each goal will be achieved and key performance indicators (KPIs) to support ongoing assessment of program performance. As discussed in Chapter 5, this framework was utilized to pre-screen potential program options, develop program scenarios, and guide scenario evaluation.

Figure 4-1 Congestion Pricing Goals Framework




	Reduce Congestion	Support Economic Development	Prioritize Equity	Promote Health and the Environment
Design Principles	• Reduce vehicle trips, especially peak trips at gateways and during major events • Improve speed and reliability of public and private transit serving North Bayshore • Shift trips away from SOVs	• Support short- and long-term growth and a vital local economy • Support access and mobility for current and future businesses • Make it simple and user-friendly • Maximize coordination and minimize administration	• Focus exemptions/discounts on key user groups • Allocate net revenue to multimodal improvements and key user groups • Address potential employer 'subsidy' of fees • Protect privacy and be transparent	• Support active and multimodal trips to, from, and within North Bayshore • Ensure easy and equitable access to open space and recreation • Reduce greenhouse gas emissions (GhG) and pollution
Key Performance Indicators	• Weekday peak period gateway vehicle trips • Weekday peak period gateway mode share • Queue lengths • Vehicle hours of delay	• Customer complaints • City staff time dedicated to program support, per transaction • Net revenue generation	• Percent of low-income travelers charged, relative to high- and middle-income travelers • Number and share of exemptions/discounts by equity demographics* • Allocation of net revenue	• Active transportation mode share • GhG emissions from vehicles in North Bayshore • Local air pollution from vehicles in North Bayshore

*Equity demographics have not yet been determined.

5

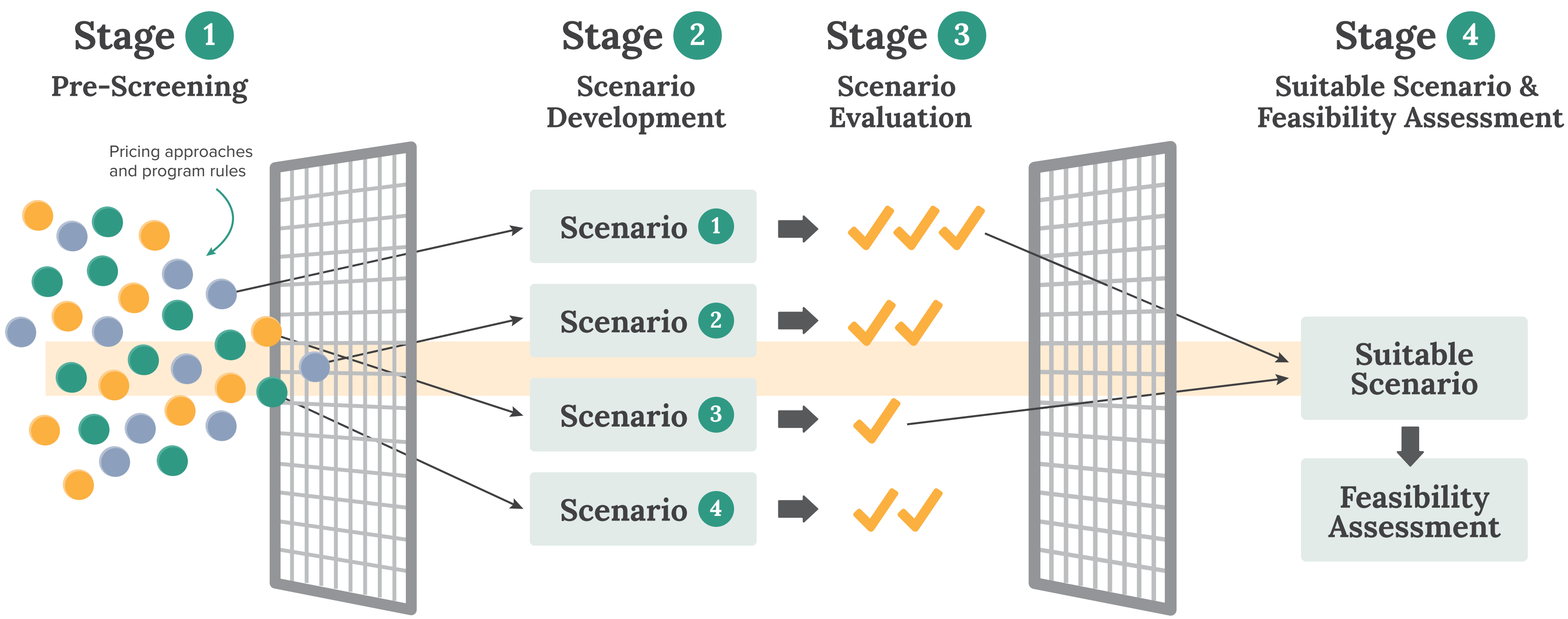
5 Scenario Development and Evaluation

This chapter summarizes how the study's Goals Framework and stakeholder outreach were used to develop four congestion pricing scenarios. The four scenarios were then evaluated using a price elasticity model to estimate the congestion charge and associated impacts on trip behavior, as well as identify the relative tradeoffs of different pricing approaches and program rules.

Evaluation Process Summary

To evaluate the feasibility and likely impacts of a potential congestion pricing program in North Bayshore, the study team developed and implemented a four-stage evaluation process. The first stage identified a variety of pricing approaches and program rules, and then pre-screened out elements that were either infeasible or 'fatally flawed.' The second stage developed four scenarios that were most likely to support program goals. The third and fourth stages included the detailed technical evaluation to identify their relative benefits and challenges.

Figure 5-1 Congestion Pricing Scenario Study Process



Stage 1: Pre-Screening

The study team used a qualitative pre-screening process to review potential congestion pricing parameters and program elements. Program elements were screened out if they were deemed infeasible to implement, ineffective for achieving program goals, or overly complex. Pre-screening of a pricing strategy for this study does not preclude its application in North Bayshore altogether. For example, parking pricing was screened out and determined not to be a focus of this study, but its future use in North Bayshore as a trip reduction tool remains applicable for the larger Circulation Study.

Pre-screening was conducted across three general categories: program type, discounts and exemptions, and administration and technology.

Program Type

Several congestion pricing program types (Figure 5-2) were considered for inclusion in the study's congestion pricing scenarios evaluation. Only cordon pricing was advanced to the scenario development stage, as it was determined to most directly address gateway congestion, be technically feasible and supported by existing technologies, and involve relatively limited infrastructure. Although technically feasible, several program parameters (Figure 5-3) were pre-screened out of the study's scenarios.

Figure 5-2 Pre-Screening Summary – Program Type

Low / Medium / High

Program Type	Pre-Screening Considerations	Feasibility Assessment	Advance to next stage?
Area Pricing	• Requires tracking trips that occur within the zone. Substantial incremental capital and operating costs. • Is not most direct way to address congestion at district gateways.	Low	✗
Cordon Pricing	• Requires limited infrastructure to implement. • Directly addresses congestion at gateways. • Can be implemented in one or both directions of travel. • More easily supported by existing technology.	High	✓
Corridor Pricing	• Is more suited to pricing an extended corridor, as opposed to a district. • If used to price gateway corridors, would be functionally equivalent to cordon pricing.	Medium	✗
Parking Pricing	• Likely to have significant impact on congestion. • City of Mountain View has limited control over parking pricing at private employers and businesses. • Remains a valuable trip reduction tool for North Bayshore.	Medium	✗
VMT/VHT Pricing	• Technology is not yet available to reliably implement.	Low	✗

Figure 5-3 Pre-Screening Summary – Program Parameters

Program Parameter	Pre-Screening Considerations	Feasibility Assessment	Advance to Next Stage?
Dynamic Pricing[7]	• Higher capital and operating costs. • May be confusing and/or frustrating to many users. • Likely increased administrative and operating costs.	Low	✗
Individual Gateway Pricing	• Would likely result in traffic shifting to unpriced gateways.	Medium	✗
Daily Charge Cap	• Providing a cap would not disincentivize travel by people making many trips into the district, especially during the peak period.	Medium	✗
Off-Peak and Weekend Pricing	• Would not address peak traffic congestion issues. • Traffic and congestion at gateways have substantial capacity at non-peak periods.	Medium	✗
Pricing Non-Peak Travel Direction	• Would not address peak traffic congestion issues. • Public may perceive as poorly targeted and unrelated to congestion problems.	Medium	✗

Low Medium High

Discounts and Exemptions

Providing discounts to certain vehicle types and user groups is an important consideration in congestion pricing program development. Some vehicles provide essential services, such as a public bus or employer shuttle; congestion pricing should not disincentivize their use. Other key constituents of a congestion pricing program, such as residents, are often given discounts to ensure residents are not disproportionately impacted and mixed-use, internal trips are encouraged. Several discounts/exemptions were considered in the pre-screening process (Figure 5-4).

Figure 5-4 Pre-Screening Summary – Discounts and Exemptions

Discount/ Exemption Type	Pre-Screening Considerations	Feasibility Assessment	Advance to Next Stage?
Household Income	• People with lower incomes may be disproportionately impacted by the congestion charge. • Discounting based on income may address many of the equity issues for district employees.	Medium	✓
District Resident	• Existing and future residents are a key focus of the Precise Plan. Pricing should not discourage new residents or affordable housing. • Support of district residents is likely needed for program success.	Medium	✓
High-Occupancy Vehicle (HOV)	• HOVs reduce congestion by consolidating vehicle trips. • HOV toll transponders are already available.	High	✓
Transit Vehicles	• Public and private transit vehicles reduce congestion by allowing many people to travel on the same vehicle.	Medium	✓
Emergency Vehicles	• Emergency vehicles provide essential services and should not be charged.	Medium	✓
Contract Employees	• It would be challenging to identify vehicles carrying these workers on an ongoing basis. • Defining contract workers could be challenging and a definition may include relatively high earners. Income-based classifications may be a more appropriate method for ensuring equity. • Contract workers cause just as much congestion as non-contract workers.	Low	✗
All Employees	• Most of the travel in North Bayshore is work-related, so discounting worker travel would functionally discount nearly all trips.	Low	✗
ADA[8] Employees	• Identifying people with disabilities on an ongoing basis would be challenging.	Medium	✗
Clean Air Vehicles	• Clean air vehicles cause the same amount of traffic congestion as non-clean air vehicles. • Clean air vehicle toll transponders are already available.	High	✗

Low Medium High

Administration and Technology

This study's scenarios assumed the City of Mountain View would not operate and administer a congestion pricing system independently; a regional tolling partner such as BATA, VTA, or a private concessionaire would be leveraged (Figure 5-5).* Several technologies were considered, but FasTrak transponders and ALPR cameras were the assumed technology (Figure 5-6).

Figure 5-5 Pre-Screening Summary – Program Administration

Administrative Structure Type	Pre-Screening Considerations	Feasibility Assessment	Advance to Next Stage?
City-Operated	• Would allow City more flexibility to design and administer a program and its rules per the specific needs of North Bayshore. • Would require substantial investment in staffing, administrative, and operational capacity. • Not supportive of a coordinated regional approach.		✗
Regional Partnership	• Allows City to leverage existing technology, administrative, and operational systems. • Roadside and CSC vendors already contracted. • Additional costs to design and implement North Bayshore-specific policies and discounts.		✓
Public-Private Partnership	• Strong potential for "turnkey" services. • Requires significant net revenue to secure partnership.		✓

*The study only included preliminary interviews with VTA staff and no agreements with regional agencies were made as part of this feasibility study.

Low Medium High

Figure 5-4 Pre-Screening Summary – Discounts and Exemptions

Technology Type	Pre-Screening Considerations	Feasibility Assessment	Advance to Next Stage?
Connected Vehicles	• Technology is not yet widespread enough.		✗
Smartphone Application	• With a purely mobile-phone based system, identifying violators would be challenging. • There are equity and privacy concerns related to a purely mobile phone-based tolling system.		✗
Transponders and ALPR Cameras	• This technology combination is standard for operations throughout the Bay Area. Hardware, software, and civil infrastructure for such systems is reliable and available. • CA law[9] and regulation[10] stipulate that vehicles shall not be required to use more than one device on all California toll facilities.		✓

Low Medium High

Stage 2: Scenario Development

After the pre-screening process, four scenarios were developed to identify and compare tradeoffs of the potential congestion pricing approaches. Two major program elements were varied among the four scenarios:

- The extent of **discounts and exemptions** offered
- If pricing occurs during **both the a.m. and p.m. peak periods, or only one**

The four scenarios were developed through iterative workshops with City of Mountain View staff and the study consultant team. The scenarios were designed to have clear distinctions from one another and to produce results that would help assess overall feasibility, estimate benefits relative to project goals, present key tradeoffs, and identify implementation considerations.

Scenario Description

Figure 5-7 summarizes the four scenarios, broadly defined as:

Scenario 1 Morning **inbound** pricing with ***limited*** discounts	**Scenario 2** Morning **inbound** pricing with ***several*** discounts
Scenario 3 **Peak directional** pricing with ***limited*** discounts	**Scenario 4** **Peak directional** pricing with ***several*** discounts

All four scenarios include some of the same assumptions and program rules. These include:

- **Cordon pricing:** Vehicles are charged when they cross the district boundary (per the directional rules) and are *not* charged for making trips that are *entirely within* the district.
- **Weekdays only:** The charge is only in effect on weekdays, and not weekends.
- **No daily cap on charges:** Vehicles that enter or leave multiple times (per the directional rules) a day during the pricing time periods would be charged for *all* eligible trips.
- Vehicles registered to **zone residents, public and private transit vehicles, and emergency vehicles** are *always exempt* from the pricing charge.
- The scenarios assume the **same administrative structure and technology.**

Figure 5-7 Evaluated Congestion Pricing Scenarios

Pricing Type	**Cordon Pricing**			
Pricing Direction	**Inbound**	**Inbound**	**Peak directional** *(inbound in a.m., outbound in p.m.)*	**Peak directional** *(inbound in a.m., outbound in p.m.)*
Pricing Parameter	**a.m. peak only** *(8:00 - 11:00 a.m.)*		**Peak periods only** *(8:00 - 11:00 a.m. and 4:00 - 7:00 p.m.)*	
Day of Week	**Weekdays**			
Unpriced Vehicles	**Vehicles registered to pricing zone residents, public and private transit vehicles, emergency vehicles.**			
Additional Discounts	**None**	**Low-income drivers**[12] *(50% discount)* **HOV 2+** *(carpool, 100% discount)* **HOV 3+** *(TNC, 100% discount)*	**None**	**Low-income drivers**[13] *(50% discount)* **HOV 2+** *(carpool, 100% discount)* **HOV 3+** *(TNC, 100% discount)*
Priced Trip Cap	**No cap on number of daily trips that could be charged.**			
Technology	**FasTrak transponders and ALPR cameras.**			
Management/ Operations	**Regional tolling partners: BATA/BAIFA and/or VTA.***			

* The study only included preliminary interviews with VTA staff and no agreements with regional agencies were made as part of this feasibility study.

Stage 3: Scenario Evaluation

The four congestion pricing scenarios were evaluated to assess overall feasibility, estimate benefits relative to project goals, present key tradeoffs, and identify implementation considerations.

Assumptions and Limitations

- A **"full buildout" condition** is assumed, where all currently planned development would be completed, increasing the number of employees and residents substantially.
- The fundamental goal of the evaluation model was to identify the **lowest congestion pricing charge** possible that would keep gateway vehicle counts below the trip cap. Each congestion pricing scenario was modeled so it would reduce vehicle trips to a level below the gateway trip cap, at the lowest possible charge.
- There is considerable uncertainty around future levels of work-from-home employment, especially for the district's major employers. To assess the potential need for congestion pricing, this study assumes travel behavior and demand **return to pre-COVID-19 levels**. It is possible that this does not occur and traffic congestion in North Bayshore does not return to pre-COVID levels. Future work on congestion pricing will need to revisit this assumption based on emerging commute and congestion data.
- This model focuses on **aggregated three-hour peak periods**, but it is likely that conditions during the peak hour of these periods are significantly more congested than the overall peak period. The model may not accurately reflect the extent to which the peak hour remains congested.
- The model assumes certain levels of trip generation for new residential and office land uses, the most significant being that new district offices will generate a **35% SOV mode share** with full buildout of the Precise Plan. As discussed below, sensitivity testing in the evaluation varies this assumption.
- It is possible that North Bayshore travelers are, on average, **less price elastic** than the baseline inputs because they tend to have higher incomes and because the SOV rate for commuters to the district is already relatively low. As discussed below, sensitivity testing in the evaluation varies this assumption.
- Vehicle **capacity-expanding** changes to the **Rengstorff**[13] and **Shoreline**[14] gateways are in the delivery, planning, and proposal stages of development. This evaluation assumes Shoreline capacity expansions are made and models the four scenarios under a Rengstorff capacity expansion build and no-build condition.

Summary of Methods

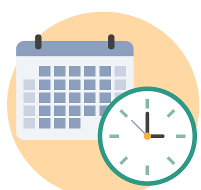
The outcomes of each congestion pricing scenario were modeled by applying elasticity-based behavioral responses to origin-destination trip flow data. This section provides a simplified overview of the modeling approach. A detailed methods document is in Appendix C.

Projected 2030 Trip Flows

The study team modified the Gateway Master Plan origin-destination trip data to reflect the full buildout condition, which is based on the *North Bayshore Precise Plan* and Google campus expansion proposals. Modifications to the Gateway Master Plan trip data included new trips associated with added employment and residential land uses. City staff provided a breakdown of the expected new employment and residential development by traffic analysis zone (TAZ).[15] Assumptions regarding the characteristics of future trips include:

Trip generation of future employment: These trip characteristics were derived from existing North Bayshore trips destined for the Googleplex TAZ and adjusted to a 35% SOV mode share for new office employees.

Trip generation of future residences: These trip characteristics were based on existing home-based trips originating in the Monta Loma/Rex Manor neighborhoods and adjusted to match North Bayshore Residential TDM Guidelines.[16]



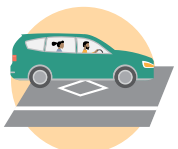
Weekday trip data **were scaled down** to reflect the 8:00 a.m. to 11:00 a.m. and 4:00 p.m. to 7:00 p.m. peak periods. This scaling matched the distribution of peak period volumes reported in spring 2020 district trip monitoring.

Discounts and Exemptions

The model first identifies trips in each scenario that would be exempt from the charge or charged a discounted amount. Assumptions for discounts and exemptions include:

North Bayshore **resident** trips are exempt in all scenarios.

E-hailing vehicles with three or more passengers are exempt in scenarios 2 and 4.



HOVs (excluding e-hailing vehicles) with two or more passengers[17] are exempt in scenarios 2 and 4.

A 50% discount for vehicles registered to households **earning under 200% of the federal poverty level** in scenarios 2 and 4.

Applying Elasticity

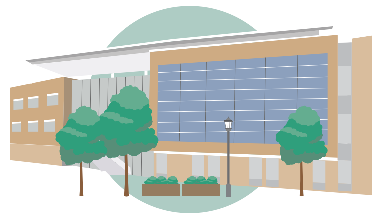
Congestion pricing's impact on trips was estimated using price elasticities, which apply an assumed percent reduction in travel associated with a percent increase in travel cost. To calculate the percent increase in travel cost, the model first calculates each trip's baseline cost, based on per-mile rates[18] and the estimated distance of each trip. The congestion charge was then divided by the baseline round-trip cost to calculate the percent change in trip cost.[19]

Assumed elasticities were based on a literature review of how different traveler types respond to congestion pricing. For work trips and non-work trips, elasticities of -0.11 and -0.23 were used, respectively.

Behavior Change

After applying elasticities, the model estimates how impacted trips change in one of the three ways shown in Figure 5-8.[20] The trips that change mode may shift from autos to any of several non-auto modes, including public transit, private transit (i.e., employer-provided shuttles), walking, or biking.

Figure 5-8 Assumed Distribution of Trip Behaviors, Impacted Vehicle Trips



	Work Trips	Non-Work Trips
Percent who change travel time[22] (the vehicle trip shifts to an unpriced period)	49%	33%
Percent who change travel mode (a vehicle trip becomes a non-SOV trip to avoid paying the charge)	26%	17%
Percent who avoid the trip (the trip is no longer made)	25%	50%

Financial Assessment

The scenario evaluation also included an estimation of net revenue by scenario. Net revenue is the amount of money a program generates after paying the cost of operating the program. As discussed in Chapter 7, net revenue can be invested into multimodal projects, trip reduction programs, and equity programs.

To estimate likely net revenue, a high-level capital and operating cost estimate was produced for each scenario. **Capital costs** include the cost of designing, procuring, and building the system (Figure 5-9). For all scenarios, the technology component makes up the bulk of the capital cost. **Operating costs** are the ongoing costs to operate the system; these expenses include overhead and per-transaction costs (Figure 5-10). Administration costs increase with the number of discounts and exemptions provided, and maintenance costs increase with the amount of equipment needed. Operating costs do not include financing costs for the system.

Figure 5-9 One-Time Capital Cost Estimates, by Scenario

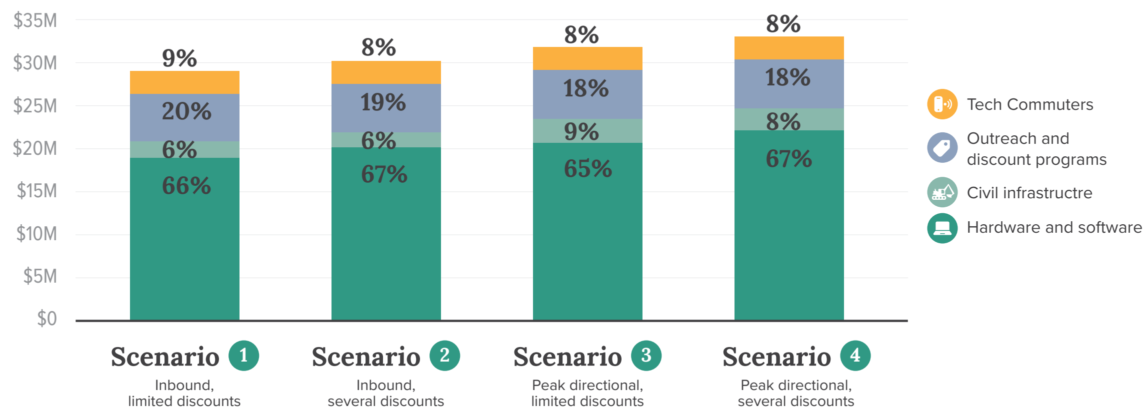
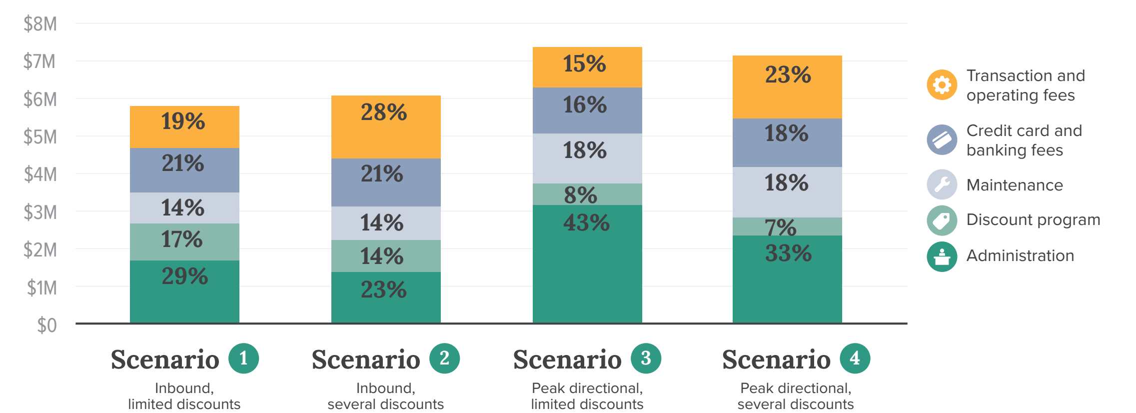


Figure 5-10 Annual Operating Cost Estimates, by Scenario



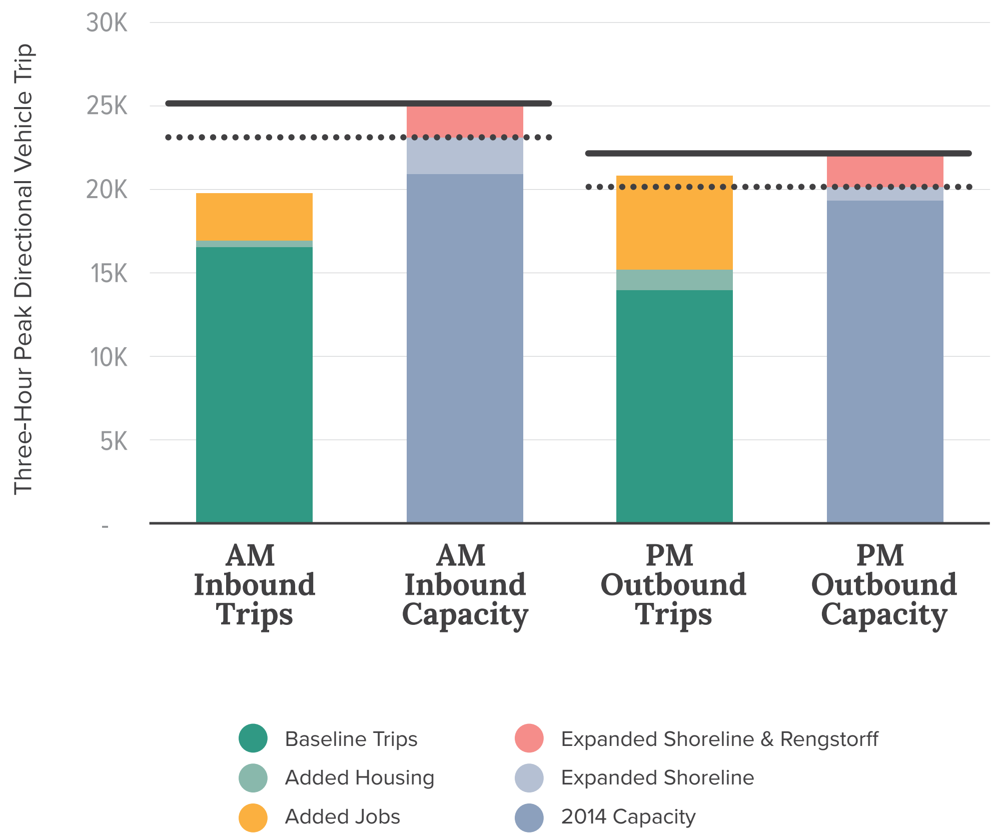
Evaluation Results

Evaluation results for several scenarios are described below. These results were produced by the elasticity-based congestion pricing model developed by the study team. This model uses input travel data from several sources, applies elasticities to these data under a given congestion pricing scenario, and estimates the outcomes from the resulting changes in travel.

Baseline Scenario

The results of the congestion pricing scenario evaluation were compared to the baseline projected trips in North Bayshore. Each congestion pricing scenario was modeled so it would reduce *vehicle trips to a level below the gateway trip cap, at the lowest possible charge*. Figure 5-11 shows the current and projected vehicle trips at the district gateways in a status quo (i.e., no congestion pricing) scenario and compares them to the overall trip cap, assuming the Shoreline Boulevard capacity expansion project is completed.

Figure 5-11 Peak Period Vehicle Trips and Trip Caps, Baseline Scenario



Congestion Pricing Scenarios

35% SOV Rate Achieved

Assuming new North Bayshore office workers achieve a 35% SOV mode share, the following are key takeaways from the congestion pricing evaluation process (Figure 5-12):

Key Takeaways

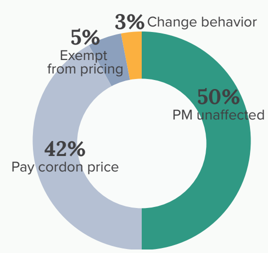
- The congestion pricing charge would need to be between **$2.00 and $3.50 per round trip** to reduce vehicle trips below the trip cap.
- Because scenarios 1 and 2 charge only a.m. inbound travel, all p.m. trips leaving North Bayshore **would be unpriced**. Another **5% to 15% of vehicle trips** would be exempt from the charge in these scenarios, based on discount and exemption criteria.
- Scenarios 3 and 4, which charge trips in both directions, have a **greater overall share of vehicle trips paying the congestion charge**.
- The inbound-only a.m. pricing scenarios 1 and 2 are estimated to produce annual net revenues of between **$5.5 million and $7.5 million**. In contrast, peak directional scenarios 3 and 4 are likely to produce little to no net revenues, meaning they **may not be feasible to operate without subsidy**.
- Incorporating more robust income- and vehicle occupancy-based **discounts increases the charge and reduces net revenue**.

Figure 5-12 Congestion Pricing Scenario Evaluation Results, 35% SOV Achieved

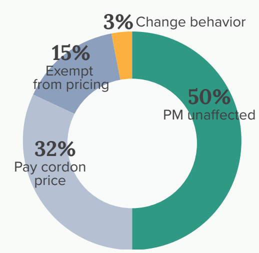
	Scenario 1		Scenario 2		Scenario 3		Scenario 4	
	Inbound AM Pricing Limited Discounts		*Inbound AM Pricing Several Discounts*		*Inbound AM & Outbound PM Pricing Limited Discounts*		*Inbound AM & Outbound PM Pricing Several Discounts*	
	AM Inbound	**PM Outbound**	**AM Inbound**	**PM Outbound**	**AM Inbound**	**PM Outbound**	**AM Inbound**	**PM Outbound**
Trip Cap	23,100	20,220	23,100	20,220	23,100	20,220	23,100	20,220
Trips Before Pricing	19,800	20,800	19,800	20,800	19,800	20,800	19,800	20,800
Trips Exempt	1,800	2,700	6,200	6,700	1,800	2,700	6,200	6,700
Reduction Needed	0	600	0	600	0	600	0	600
Cordon Price	$3.00	N/A	$3.50	N/A	$1.00	$1.00	$1.50	$1.50
Trips Changed by Pricing	800	600	800	600	500	600	500	600
...Changed Time	400	100	400	100	300	300	300	300
...Changed Mode	200	200	200	200	100	100	100	100
...Not Made	200	300	200	300	100	200	100	200
Annual Net Revenue	$7.3M		$5.6M		$610K		-$270K	

Baseline Assumptions

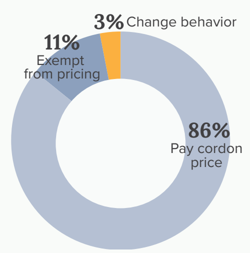
Round-trip price: $3.00



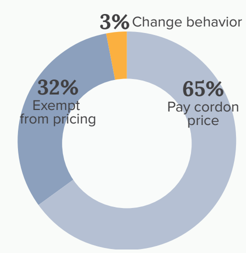
Round-trip price: $3.50



Round-trip price: $2.00



Round-trip price: $2.50



Congestion Pricing Scenarios

Sensitivity Test,

45% Rate SOV Achieved

Because the projected 35% SOV mode share for new office trips in 2030 is an ambitious goal, the study team conducted sensitivity testing to assess the impacts of a higher/more conservative SOV mode share on scenario outcomes (Figure 5-13). Key takeaways from this test are:

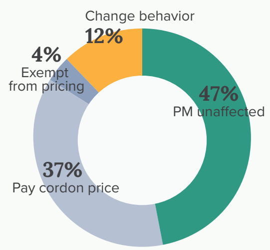
Key Takeaways

- The congestion pricing charge would need to be substantially higher, **between $4 and $13 per round trip**, to reduce vehicle trips below the trip cap.
- With higher SOV rates and a higher required charge, peak directional scenarios **3 and 4 are more likely to be financially feasible**.
- Due to the higher charge, more behavior change is estimated due to congestion pricing; **approximately 9% to 12%** of drivers are likely to change behavior.
- All pricing scenarios are estimated to produce substantially more annual net revenue, ranging from **$17.7 million to as high as $33.7 million**.

Figure 5-13 Congestion Pricing Scenario Evaluation Results, 45% SOV Rate Achieved

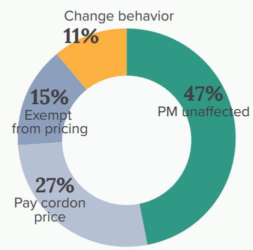
	Scenario 1		Scenario 2		Scenario 3		Scenario 4	
	Inbound AM Pricing Limited Discounts		*Inbound AM Pricing Several Discounts*		*Inbound AM & Outbound PM Pricing Limited Discounts*		*Inbound AM & Outbound PM Pricing Several Discounts*	
	AM Inbound	PM Outbound	AM Inbound	PM Outbound	AM Inbound	PM Outbound	AM Inbound	PM Outbound
Trip Cap	23,100	20,200	23,100	20,200	23,100	20,200	23,100	20,200
Trips Before Pricing	20,600	22,400	20,600	22,400	20,600	22,400	20,600	22,400
Trips Exempt	1,800	2,700	6,400	7,100	1,800	2,700	6,400	7,100
Reduction Needed	0	2,200	0	2,200	0	2,200	0	2,200
Cordon Price	$10.50	N/A	$13.00	N/A	$3.50	$3.50	$4.50	$4.50
Trips Changed by Pricing	2,700	2,200	2,700	2,200	1,900	2,200	1,800	2,200
...Changed Time	1,300	500	1,300	500	900	1,000	900	1,000
...Changed Mode	700	800	700	800	500	500	500	500
...Not Made	700	1,000	700	1,000	500	700	500	700
Annual Net Revenue	$33.7M		$27.7M		$20.8M		$17.7M	

Round-trip price: $10.50

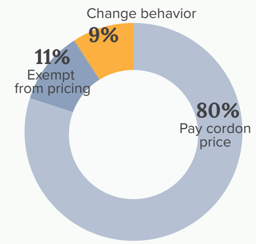


45% SOV mode share for new office

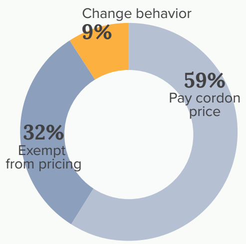
Round-trip price: $13.00



Round-trip price: $7.50



Round-trip price: $8.50



Congestion Pricing Scenarios

Sensitivity Test, 25% Reduced Price Elasticity

Because elasticities used in the model were derived from several studies of built environments with higher SOV mode shares and lower average incomes than North Bayshore, the study team tested lower/more conservative elasticities (Figure 5-14). Key takeaways from this test are:

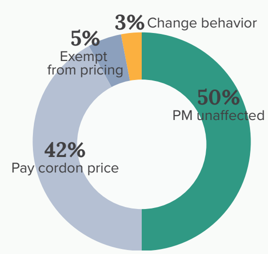
Key Takeaways

- The congestion pricing charge would need to be **between $3 and $4** to reduce vehicle trips below the trip cap.
- Net revenue also increased to between approximately **$3 million and $12 million**. Although reducing the elasticity produced greater charges and net revenue than the baseline evaluation, these increases were not as substantial as they were in the 45% SOV mode share sensitivity test.

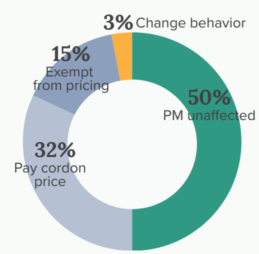
Figure 5-14 Congestion Pricing Scenario Evaluation Results, 25% Lower Elasticity

	Scenario 1		Scenario 2		Scenario 3		Scenario 4	
	Inbound AM Pricing Limited Discounts		*Inbound AM Pricing Several Discounts*		*Inbound AM & Outbound PM Pricing Limited Discounts*		*Inbound AM & Outbound PM Pricing Several Discounts*	
	AM Inbound	PM Outbound	AM Inbound	PM Outbound	AM Inbound	PM Outbound	AM Inbound	PM Outbound
Trip Cap	23,100	20,200	23,100	20,200	23,100	20,200	23,100	20,200
Trips Before Pricing	19,800	20,800	19,800	20,800	19,800	20,800	19,800	20,800
Trips Exempt	1,800	2,700	6,200	6,700	1,800	2,700	6,200	6,700
Reduction Needed	0	600	0	600	0	600	0	600
Cordon Price	$4.00	N/A	$5.00	N/A	$1.50	$1.50	$1.50	$1.50
Trips Changed by Pricing	800	600	800	600	500	600	500	600
...Changed Time	400	100	400	100	300	300	300	300
...Changed Mode	200	200	200	200	100	100	100	100
...Not Made	200	300	200	300	100	200	100	200
Annual Net Revenue	$11.3M		$9.1M		$3.9M		$2.9M	

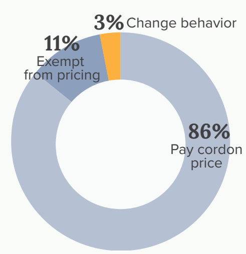
Round-trip price: $4.00



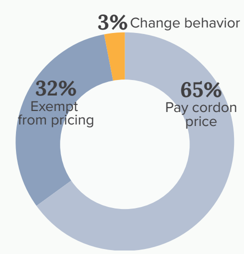
Round-trip price: $5.00



Round-trip price: $3.00



Round-trip price: $3.50



Reduced elasticity to reflect already low SOV rates

Summary of Key Findings

Key Finding 1

If Rengstorff gateway capacity is expanded and 35% SOV is achieved, congestion pricing is likely not needed.

Adding additional vehicle capacity at Rengstorff would allow the district to accommodate projected future baseline vehicle trips. Even if a 35% SOV mode share for new office trips is not achieved, it is likely that excess vehicle trips would be better mitigated through a less costly and complex set of mitigation strategies. Rengstorff capacity expansion may still be necessary for operational improvements, a decision further discussed in the *North Bayshore Circulation Study*.

Key Finding 2

If the Rengstorff gateway capacity is not expanded, congestion pricing is potentially a useful tool and shows financial viability.

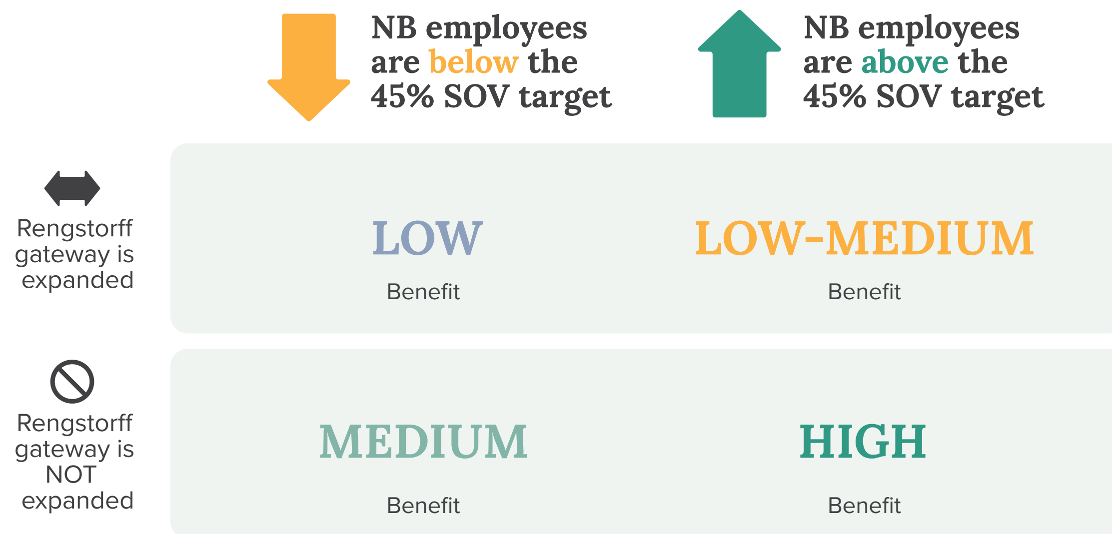
Without additional capacity expansion at Rengstorff, it is likely that p.m. peak vehicle trips will exceed the trip cap, especially in the peak hour and if new office does not achieve or exceed the 45% SOV target. If Rengstorff is not expanded, congestion pricing can be an effective and revenue-positive tool for achieving the needed vehicle trip reductions.

Key Finding 3

If desired mode shifts are harder to achieve than expected, congestion pricing will be a more important tool and more financially viable.

If future office trips in North Bayshore do not achieve the SOV target, the need for congestion pricing increases significantly. If future office trips achieve only a 45% SOV mode share (still a decline from the current rate), about 2,200 p.m. peak period trips will need to be eliminated. Congestion pricing will likely be an effective and revenue-positive tool for achieving these needed vehicle trip reductions.

Figure 5-15 Comparison of Congestion Pricing Need



Key Finding 4

The a.m. inbound pricing scenarios require higher charges and raise more net revenue than bi-directional scenarios.

A congestion pricing program that charges vehicles only in the inbound direction during the a.m. peak period will need to charge a higher round-trip price than a program that charges vehicles in both peak directions. Although the round-trip charge would be higher for an inbound-only a.m. scenario, the net revenue collected would also be greater, providing the City of Mountain View more money to reinvest in transportation improvements.

Key Finding 5

More discounts and exemptions translate to higher charges but less net revenue.

Providing additional discounts and exemptions in a congestion pricing program can improve equity outcomes and bolster political support. Adding these discounts, however, results in higher charges for undiscounted vehicles and less overall net revenue. Limiting the number of discounts reduces the charge and increases the amount of net revenue collected.

Key Finding 6

Certain trip types and travelers are more likely to be impacted.

Certain types of trips made into and out of North Bayshore are more likely to be affected by congestion pricing than others. Trips that are shorter than five miles, non-work trips, and trips made by low-income drivers are all more likely to shift time, mode, or occurrence based on congestion pricing.

Evaluation Summary

The evaluation of the study's four congestion pricing scenarios was closely tied to the Goals Framework introduced in Chapter 4 of this report. Figure 5 16 shows the performance of each scenario relative to the framework's goals and select KPIs. For more quantitative results of the scenario evaluation, see Appendix D.

Figure 5-16 Scenario Evaluation Summary

	Congestion Pricing Goals and KPIs	Scenario 1 *Inbound AM No Discounts*	Scenario 2 *Inbound AM Several Discounts*	Scenario 3 *Peak Direction No Discounts*	Scenario 4 *Peak Direction Several Discounts*
Goals	Reduce Congestion	✓✓✓	✓✓✓	✓✓	✓✓
Goals	Support Economic Development	✓✓	✓	✓	✓
Goals	Prioritize Equity	✓	✓✓	✓	✓✓
Goals	Promote Health and the Environment	✓✓✓	✓✓✓	✓✓	✓✓
KPIs	Reduction in Gateway Vehicle Trips	✓✓✓	✓✓✓	✓✓	✓✓
KPIs	Reduction in Gateway SOV Mode Share	✓✓✓	✓✓✓	✓✓	✓✓
KPIs	Share of Vehicle Trips Exempt or Discounted	✓	✓✓	✓✓	✓✓✓
KPIs	Reduction in Annual GhG Emissions	✓✓✓	✓✓✓	✓✓	✓✓
KPIs	Administrative and Technical Complexity	✓✓	✓✓✓	✓✓	✓✓✓
KPIs	Capital and Operating Costs	✓✓	✓✓	✓✓✓	✓✓✓
KPIs	Net Revenue Generated	✓✓✓	✓✓	✓	✓

6

6 Suitable Program

A suitable congestion pricing program is based on the results of the scenario evaluation process, stakeholder outreach, and engagement with City staff. The suitable program is meant as a guiding framework for Mountain View stakeholders to advance during further planning; it is not meant as a formal program for City Council to approve at this time.

Defining a Suitable Program

The suitable program is an inbound-only cordon pricing program, based on scenarios 1 and 2 from the evaluation process. Complete details are in Figure 6-1, and further discussion of the suitable program is below.

Figure 6-1 Suitable Congestion Pricing Program

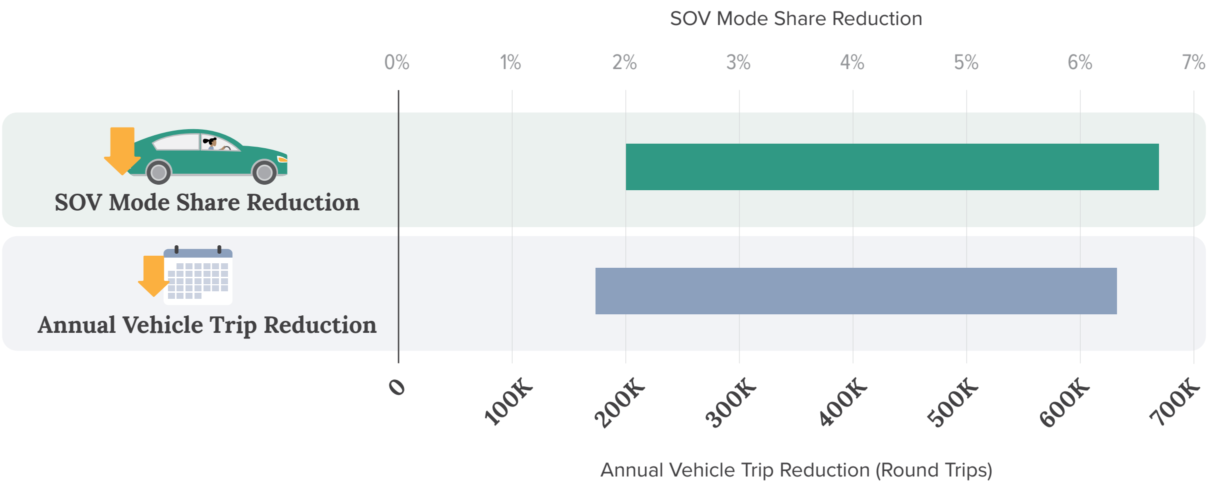
Pricing Type	Cordon Pricing
Pricing Direction	Inbound
Pricing Hours	8:00 a.m. - 11:00 a.m.
Pricing Days of Week	Weekdays
Unpriced Vehicles	Vehicles registered to pricing zone residents, public and private transit vehicles, emergency vehicles
Additional discounts	TBD
Priced Trip Cap	No cap on number of daily trips that could be charged
Charge	$5 to $13
Technology	FasTrak transponders and ALPR cameras
Management/Operations	Regional tolling partners: BATA/BAIFA and/or VTA*

*The study only included preliminary interviews with VTA staff and no agreements with regional agencies were made as part of this feasibility study.

Congestion Reduction Impacts

The primary goal of congestion pricing is to reduce traffic. The suitable program is projected to reduce vehicle trips into and out of North Bayshore by between 175,000 and 650,000 annually, and reduce the SOV mode share by between 2% and 7% (Figure 6-2).

Figure 6-2 Estimated Congestion Reduction Effects of Suitable Program



Financial Implications

The suitable program is projected to cost approximately $30 million in one-time capital costs, and approximately $7 million in annual operating costs. The program is projected to earn approximately $12 million to $41 million in annual revenue, producing an annual net revenue of between $5 million and $34 million. More precise ranges are in Figure 6-3.

The range in costs and revenue is based on the types of discounts and exemptions provided in the suitable program, as well as the SOV rate of office workers. If additional discounts are provided, such as those for HOVs and low-income drivers, capital and operating costs are likely to increase, and revenues are likely to decline. If the new office worker SOV rate is considerably higher than 35%, revenues increase significantly.

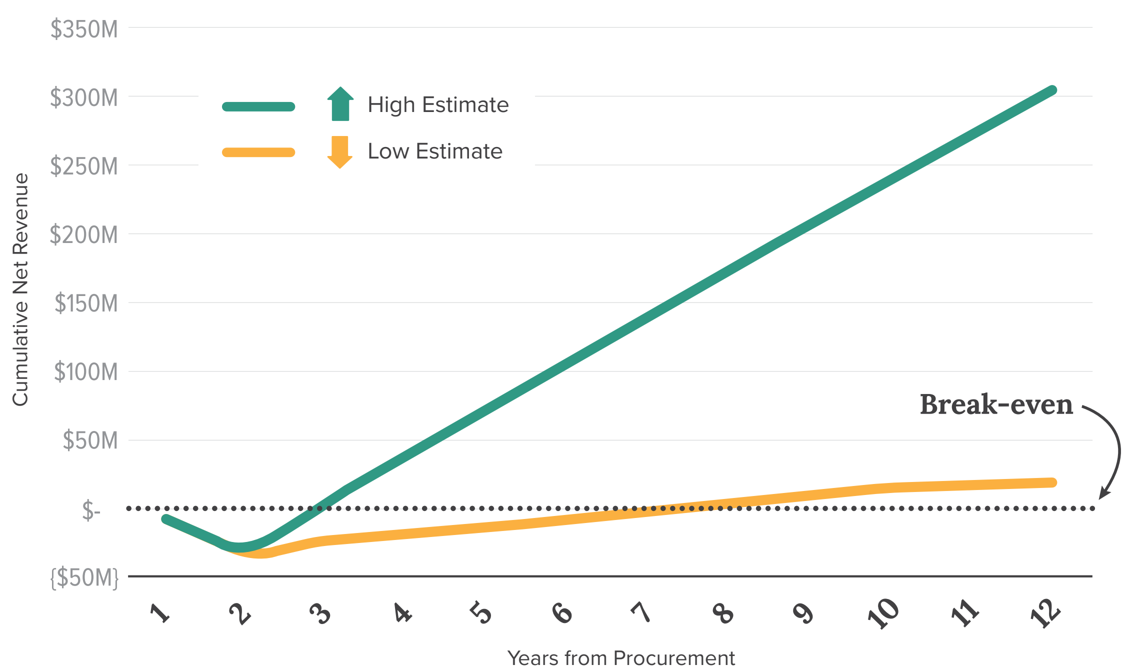
The suitable congestion pricing program is projected to break even in three to eight years from procurement initiation (Figure 6-4). One-time capital costs to design, procure, and build the suitable program are major up-front expenses, but when revenue generation from the tolling system begins, cumulative net revenue quickly climbs and is estimated to generate net revenue each year. Net revenue is an important indicator of how much funds the program will be able to invest in transportation in North Bayshore, as well as the program's financing feasibility.

The break-even projections shown in Figure 6-4 assume startup capital costs accrue for two years before revenue is generated, and mid-life maintenance capital costs occur periodically over the life of the program.

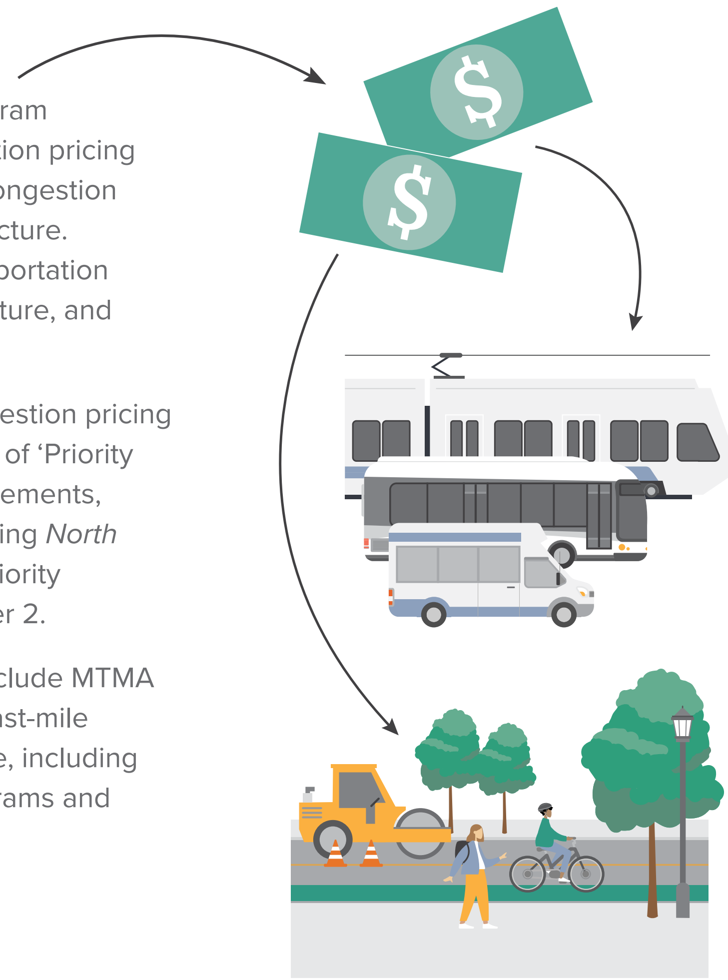
Figure 6-3 Estimated One-Time Capital Costs, Annual Operating Costs, and Annual Net Revenue of Suitable Program

1x Annualized one-time capital costs	$28M - $30M
Annual operating costs	$6M - $8M
Annual revenue	$12M - $42M
Net annual revenue (excluding annualized capital costs)	$6M - $34M

Figure 6-4 Cost and Revenue Outlook of Suitable Program



Principles for Net Revenue Investment



One of the most important decisions to be made in congestion pricing program design is how to allocate net revenue from the program. In existing congestion pricing programs in London, Stockholm, Milan, and in the planned New York City congestion pricing program, net revenues are largely invested in public transit infrastructure. Existing congestion pricing programs also invest net revenue in other transportation improvements, including road resurfacing, pedestrian and bicycle infrastructure, and freight network improvements.

Although this study does not identify specific programs or projects for congestion pricing net revenue to be invested in, the City of Mountain View has an existing list of 'Priority Transportation Improvements' for the North Bayshore district. These improvements, which are described in the 2017 *North Bayshore Precise Plan* and the ongoing *North Bayshore Circulation Study*, are updated and refined by the City. Current priority transportation projects that the city plans to pursue are described in Chapter 2.

Other potential congestion pricing net revenue investment opportunities include MTMA programs such as Carpool Link, North Bayshore shuttles, and guaranteed last-mile reimbursements. Other TDM programs are good candidates for net revenue, including transit subsidies, bikeshare programs, and other non-auto commuting programs and projects.

Feasibility Considerations

The suitable program is considered a feasible approach to congestion pricing in North Bayshore, although there are several risks and challenges to implementation. Figure 6-5 summarizes the pros and cons of the feasibility considerations discussed above.

Administrative Capacity

Procuring and operating a congestion pricing program is not a simple task. Toll facilities use specialized hardware and software and are interconnected with regional computer systems. Cities the size of Mountain View typically do not have staff with the experience and expertise to procure and operate toll systems. It is assumed in this study that the City would partner with a regional agency to operate a congestion pricing program. This partner would likely be BAIFA/BATA or VTA, and the suitable program operates under this assumption. It is important to note that only preliminary interviews with VTA staff were conducted and no agreements with regional agencies were made as part of this feasibility study.

Community Support

Without community support, authorizing congestion pricing at the local and state levels will be challenging. Good program design can help build support. The suitable program targets only the congested weekday periods and exempts North Bayshore residents; both rules are anticipated to boost local support. Other tools for building support include clear communications around program benefits and seeking stakeholder input during program design and decisions on allocation of net revenue.

Dollar Amount of Congestion Charge

The dollar amount of the congestion charge is a conspicuous number that impacts both public perception of congestion pricing and program revenue. If a charge is perceived as too high, support for the program would likely decline, regardless of congestion reduction impacts. If the charge is too low, it will likely be ineffective at reducing congestion and require municipal subsidy. The range of the suitable program base charge ($5 to $13) indicates feasibility. An initial minimum charge of $5 offers a round figure that is likely to be perceived as forceful and fair.[22] The estimated maximum charge is higher but considerably lower than the maximum estimated New York City congestion charge of $23 (the only peer U.S. program).[23]

Equity

The equity outcomes of a congestion pricing program are directly related to the charge amount and who received discounts or exemptions. If discounts for low-income drivers are provided and net revenue is invested in supportive services and programs, equity concerns can be mitigated. If means-based discounts are not provided, equity outcomes may be worsened, and the program would need to strongly prioritize net revenue investments in equity programs and services.

The suitable program does not define a complete discount and exemption program but does estimate a range of likely outcomes, assuming a 50% discount for low-income drivers. By adding income-based discounts, program capital costs are estimated to increase by 2%, and annual operating costs are estimated to increase by 1-3%. The addition of income-based discounts is also estimated to reduce gross annual revenue by 3-6%.

Financing the System

Congestion pricing's feasibility requires financial sustainability, ensuring that financing for start-up capital and operating costs can be secured. To achieve these benchmarks, a program must break even after several years and generate enough net revenue to recover up-front costs and pay down debt. The ability to use net revenue that remains after these payments is also crucial to program success, as these investments can deliver some of the program's most visible and impactful transportation improvements.

The suitable program is projected to break even in three to eight years, which indicates the program has ability to secure financing and make investments in North Bayshore's transportation systems. The estimate of projected revenues may also make the program a candidate for public-private-partnership financing.

Large Employer Reimbursements

It is possible that one or more large employers in North Bayshore may reimburse employees for the congestion charge, as an employee benefit. This action should be considered a potential outcome, as it would significantly challenge the success of congestion pricing in North Bayshore. The City should continue to monitor this potential outcome and explore ways to mitigate its impacts on a congestion pricing program.

Development Impacts

One of the chief concerns raised by real estate interests during this study's stakeholder engagement was congestion pricing's potential impact on future development in North Bayshore. The suitable congestion pricing program would have two likely impacts on the future of real estate development in the district:

1. Congestion pricing would marginally increase travel costs for non-residents accessing North Bayshore. This means that future real estate that anticipates people from outside the district accessing their property during the morning peak period may need to account for the congestion charge in their business models. On the other hand, a reduction in peak period congestion may increase the attractiveness of North Bayshore as a destination for non-residents, as travel times will be shorter and, for many travelers, the time saved may be more valuable than the congestion charge.
2. Congestion pricing would allow development to occur in North Bayshore. If pre-COVID vehicle counts continue to increase with real estate development in the district, development approvals in North Bayshore may be impacted; a congestion pricing program would reduce vehicle counts and support planned development.

Figure 6-5 Feasibility Assessment of Suitable Program

Feasibility Consideration	Pros	Cons
Administrative capacity	• Likely to be implementable with regional tolling partners. • Supports goal for consistent tolling rules and policies.	• Will require incorporation of regional tolling partners in local operational decisions.
Community support	• Traffic reduction impacts will benefit most North Bayshore residents and visitors. • Benefits can be clearly communicated. • Residents would be exempt from charge.	• Congestion charge will impact approximately 17,000 vehicles per weekday at full build out.
Dollar amount of congestion charge	• Dollar amount is estimated to be lower than many existing programs. • Dollar amount may be lower than nearby tolls, such as those on the Dumbarton Bridge.	• Dollar amount may be higher than nearby tolls, such as those on the Dumbarton Bridge.
Equity	• If income-based discounts are provided, congestion pricing can... – minimize impacts to low-income households with limited transit access or long commutes. – build public support for program. • If income-based discounts are not provided, congestion pricing can still advance equity by investing net revenue in equity mitigations.	• If income-based discounts are provided, congestion pricing will likely... – have a higher base charge, higher startup and ongoing costs, and less net revenue. • FasTrak START discount program is currently in pre-pilot stage. • Income-based discount categories may need to be modified for North Bayshore, which would likely increase costs.
Financing the system	• Program is likely to be financially sustainable and able to secure financing. • Program may be candidate for PPP financing.	• See large employer reimbursements, below.
Investing congestion pricing net revenue	• Program will likely produce enough net revenue to make major investments in North Bayshore's transportation system.	• Achieving consensus on net revenue priorities may be challenging.
Large employer reimbursements	• None	• Program success will be challenged if large employers subsidize the congestion charge for employees.

7

7 Implementation Roadmap

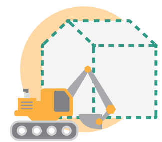
Conditions of Implementation

There are several factors that will inform a decision to implement a congestion pricing program in North Bayshore. The City of Mountain View will want to evaluate these factors holistically, knowing that congestion pricing is one potential tool to address traffic in North Bayshore as it grows and evolves in the coming decades.

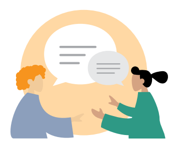
COVID-19 recovery: The pace and degree to which employees return to the office, as well as impacts to their commute behaviors, remains unknown. The coming year may reveal key trends that could inform the need and timing of congestion pricing.

Mode shift goals and status of trip cap: This study evaluated congestion pricing across a spectrum of SOV mode splits and corresponding impacts to the trip cap. Progress towards SOV mode share goals, or lack thereof, will directly impact trip volumes and the timing of pricing as a mitigation.

Anticipating trip cap exceedance: Because a congestion pricing system would likely take several years to implement, beginning system procurement and construction prior to anticipated exceedance of the North Bayshore trip cap could be pursued. This approach allows congestion pricing to begin operating as soon as the trip cap is met and as gateway operations move closer to ”breakdown” condition.



New development and infrastructure improvements: The timeline by which new office and housing development occurs, plus the construction of priority transportation projects, will impact trip activity at the gateways. Faster than anticipated development or project delays will impact conditions for implementation.



Public and stakeholder support: Public and key stakeholder support for the program will make authorization and implementation a simpler process for the City. Achieving robust public support prior to implementation, however, can be challenging. In Stockholm, fewer than 40% of residents supported congestion pricing prior to implementation of a pilot program. After the program was in place, public support reached nearly 60%, and eight years later, over 70% of residents supported congestion pricing.[24] Mountain View may want to consider a similar pilot approach.

Implementing a Program

It can take several years to bring a congestion pricing program from the planning process to a functioning program. To implement a program, planning, authorization, financing, and construction hurdles must be overcome. This section describes the steps needed to bring a congestion pricing program from concept to reality.

Congestion pricing implementation can be separated into three stages, each of which includes several major steps. Although the timeline for implementing a program can range, congestion pricing would likely be implementable in **four to six years**.

Step 1

Plan

1–1.5 Years

- Finalize core policies and rules
- Select technology and administration
- Create financial plan and procurement strategy
- Continue stakeholder outreach
- Establish program schedule

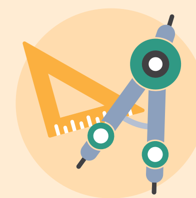
Step 2

Authorize

1–2 Years

- Develop a Concept of Operations plan
- Develop agreements with tolling partners
- Pursue tolling authorization
- Secure financing

Step 3



Procure, Design & Construct*

2–2.5 Years

- Design and implement toll system
- Design and construct civil infrastructure
- Go-live
- Operations and maintenance

*Assuming system is not procured as public-private partnership.

1 Step 1: Plan

Planning a congestion pricing program is an iterative process that should balance the City's congestion reduction needs, a pricing program's financial needs, and the needs of potential partners. This step could take between 12 and 18 months.

Finalize Core Policies and Rules

This study identifies a preliminary set of congestion pricing policies and rules. The next step will require more robust analysis to finalize the detailed policies and rules that a program will operate under. These include pricing levels, days and times of operation, exemptions and discounts, enforcement, how often the charge is adjusted, and net revenue uses.

Exemptions and discounts are a particularly important part of a potential future congestion pricing program's rules, and one which will likely need to be addressed in depth through public and stakeholder engagement. Many constituencies and demographics will likely appeal for a discounted charge, so care will need to be taken to align program goals and equity concerns without reducing program efficacy. San Francisco's congestion pricing study is taking a collaborative approach to this work, where community members and stakeholders are invited to 'co-create' congestion pricing programs based on their desired outcomes and the program's operational and financial constraints. Above all, further planning should maximize regional consistency with existing tolling rules and policies.

Select Technology and Administration

If the City uses FasTrak tolling technology and the BATA RCSC for tolling, the program will leverage a mature tolling system, large customer base, and the appropriate technical skills and staffing. The City will need to establish a collaborative agreement with a regional partner to help administer and operate the toll system, including procurement and oversight of the system contract. Potential partners may include VTA or BAIFA/BATA, although further engagement with these entities is needed.

Because the FasTrak system does not currently have the capability to administer residence-based and some other discounts or exemptions, the City will also need to identify the needed mechanisms for implementing these discounts with its tolling partner.

Create Financial Plan and Procurement Strategy

A congestion pricing financial plan is an important planning tool for identifying funding and procurement strategies. This plan will include a traffic and revenue (T&R) study with detailed projections of revenue and capital, operating, and financing costs. These projections will illuminate if toll revenue bonds or a public-private partnership (PPP) are viable financing options. The financial plan will also finalize plans for how net revenue is invested. If net revenue projections are strong, a PPP would let the City shift more of the risk and responsibility to the chosen concessionaire. If the City were to use a more traditional bond financing approach, it is recommended the procurement process prioritize toll system design, as civil infrastructure should be designed and built to support the toll system, not vice versa.

Continue Stakeholder Outreach

It will be important for the City to broaden and deepen engagement with the public and key stakeholders, especially regional tolling agencies. This outreach will provide valuable feedback, educate about program goals and benefits, and help build critical champions for when it comes time to seek tolling authorization.

Establish Program Schedule

The final planning stage is to develop an overall programmatic schedule with critical milestones and dependencies among tasks. A solid schedule ensures implementation stays on track and helps manage scheduling risks. Examples of these dependencies are that tolling authorization depends on completing the Concept of Operations and financial plan, and that procurement and toll revenue bond issuance depend on tolling authorization.

2 Step 2: Authorize

Authorizing a congestion pricing program is perhaps the most critical step in implementation. A detailed plan for the program must be prepared, agency and government approval given, and financing secured. This step could take between one and two years. If authorization is pursued at the state legislative level, the legislative calendar partially determines the timeline of this step.

Develop a Concept of Operations

The Concept of Operations (CoA) is a formal document that describes the congestion pricing program and is used to present the project to decisionmakers and other stakeholders. The CoA is a living document that evolves as planning and design work progresses. A CoA typically includes:

- Mission for, purpose of, and need for the project
- Current conditions and characteristics of the proposed pricing area
- Design and system standards to which the project will be developed
- The different alternatives that will be assessed
- Operational policies, including hours of operation, charge-setting procedures, and exemptions
- Multimodal improvements to be implemented, such as new bus service
- Legislative approvals and other agreements needed to implement the project

The CoA should inventory all known needed institutional requirements to implement the congestion pricing program, as well as any outstanding institutional and/or technical needs. These requirements could range from issues such as needing to pass toll authorization legislation to enhancing travel demand models. The document should also describe the public information program that will collect feedback and build support for the program. Lastly, the CoA should define the roles of stakeholders that would implement and operate the system.

Develop Agreements with Tolling Partners

After a joint determination of which partner agencies will administer different parts of the toll system, formal agreements need to be drafted and executed between the City and its partners. These will likely include:

1. **BATA RCSC:** A tolling service agreement between the City and BATA for the use of the FasTrak RCSC. The agreement will include costs for handling customer transactions, payments, inquiries, ramp-up, discount and residential exemptions (if applicable), and violations processing.

2. **Roadside toll system:** Based on a tolling partner selection, an agreement is needed to document roles, responsibilities, and costs for the tolling partner to implement the roadside toll system on the City's behalf.

3. **Enforcement:** If police officers are needed to enforce vehicle occupancy-based discounts, the City may need an agreement with the California Highway Patrol, San Mateo Sherriff, and/or the City of Mountain View Police documenting the amount, type, and rules of enforcement.

Pursue Tolling Authorization

To implement congestion pricing, the City needs two main legal authorities:

- The power to **impose a toll** on a public road. This includes the ability to set toll rates, create discounts and exemptions, and use toll revenues.
- The power to **enforce the toll**. This allows the City to pursue violators for nonpayment and assess a penalty fee for violations.

To obtain these authorities, the City will need to conduct a thorough legal review of federal, state, and local legislation and regulations. Upon preliminary examination of peer tolling authorizations in California, three potential options exist for the City to seek tolling power:

1. **Directly obtain authority to toll from the California Legislature:** The City could follow the approach of the San Francisco Board of Supervisors, which lobbied the California Legislature to pass Assembly Bill 981 for authority to impose a toll on Treasure Island.[25]
2. **Apply to the California Transportation Commission (CTC) for authority:** If potential tolling sites are located on Caltrans right-of-way, then the City, through a state-recognized and designated regional transportation authority, could apply to the CTC to obtain tolling powers.[26] In 2015, the CTC was delegated legislative responsibility to approve tolling of transportation facilities in California.[27] The CTC has a published process and guidelines for applying to toll facilities on its website and has approved three toll facilities to date: LA Metro's I-105 Express Lanes, Orange County Transportation Authority's I-405 Express Lanes, and San Mateo County Joint Powers Authority's U.S. 101 Express Lanes.
3. **Interpret tolling as a local city's rental fee:** Much like the ability to impose street parking fees, the City may be able to interpret tolling as a rental fee for the use of local public roads under the California Constitution's Article XIII.[28] Under this interpretation, the City Council could pass a local ordinance approving congestion pricing. As a fee instead of a tax, voter approval would not be needed.

The City will also need to be aware of other California tolling-related laws and regulations:

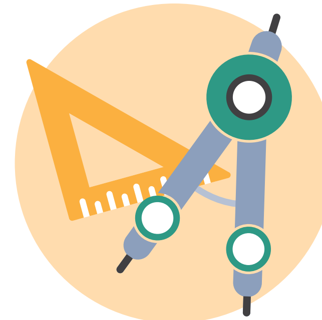
1. **Transponder compatibility:** California law[29] and regulation[30] stipulate that vehicles shall not be required to use more than one device (i.e., FasTrak transponders) on all California toll facilities. Therefore, the City's congestion pricing program would need to use compatible tolling transponder technologies used by other California toll operators.
2. **Privacy protection for toll customers:** California has strict safeguards when it comes to personally identifiable information of toll customers.[31] A North Bayshore congestion pricing would need to abide by these regulations.
3. **Federal oversight:** Federal tolling regulations primarily cover federally funded facilities. Therefore, as long as the City's congestion pricing footprint remains on local roads, federal tolling oversight and jurisdiction is limited.

Secure Financing

System procurement and civil infrastructure construction cannot begin until funding is secured. Up-front funding is needed to both cover capital costs and support the first several years of operations, as congestion pricing may run a short-term operating deficit. The City has three potential methods for funding congestion pricing:

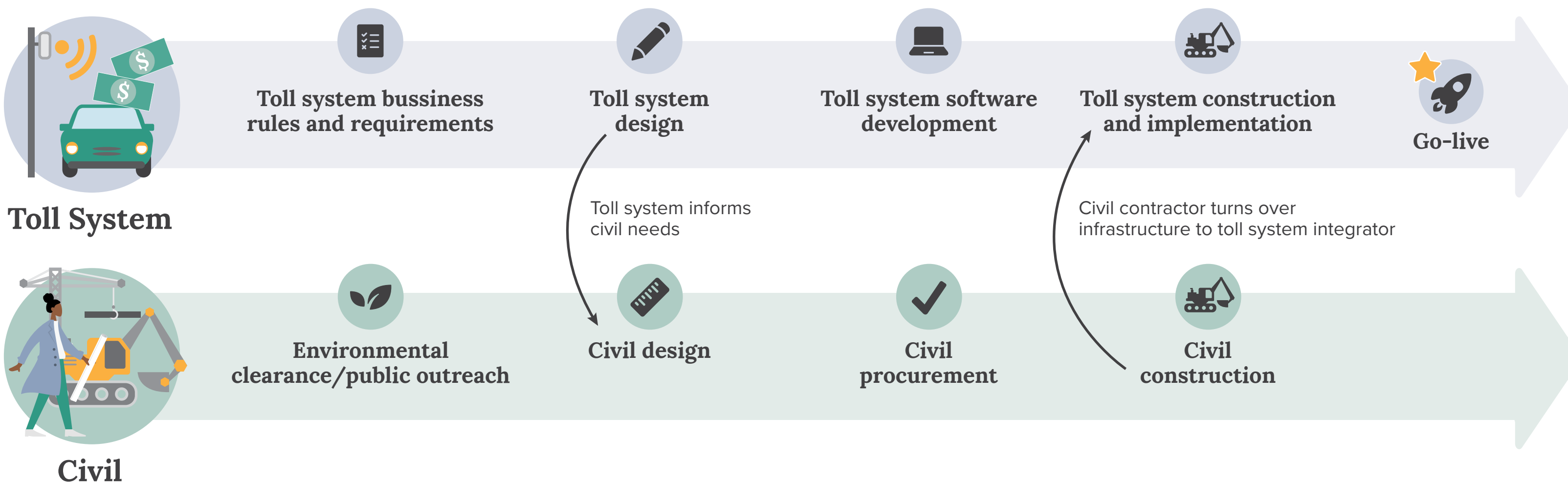
1. **Traditional funding sources:** The City of Mountain View could fund congestion pricing with municipal funds or regional transportation funds, similar to Santa Clara County's Measure B (2016) or Regional Measure 3 (2018) sales tax measures to fund transportation infrastructure.
2. **Toll revenue bonds:** If a congestion pricing program is projected to generate sufficient net revenue, the City may be able to issue bonds backed by future toll revenues. This type of debt financing typically requires an investment-grade T&R study be conducted before bond issuance, to inform credit rating agencies and potential investors.
3. **PPP financing:** If a congestion pricing program is projected to generate significant net revenue, it may be a candidate for a PPP. In this financing model, prospective concessionaires evaluate the costs and risks of the program and, if interested, bid to build and operate the system. This approach offers the most 'turnkey' method for operating a congestion pricing program. Obtaining an investment-grade T&R study will help the City better understand if a PPP approach is feasible.

3 Step 3: Procure, Design & Construct



In the planning step of congestion pricing implementation, the City would have selected a procurement strategy. In this section, it is assumed that procurement strategy is a combination of design-build for the roadside toll system and design-bid-build for civil infrastructure. If the City choses a PPP procurement and financing strategy, then the following implementation process would be more streamlined, with the PPP developer shouldering the responsibility and risk of a design-build congestion pricing procurement.

Under a typical procurement strategy, the toll system and supportive civil infrastructure are procured and constructed separately but concurrently. The graphic below illustrates this process, with a more detailed description below. This step in the process would likely take between two and two-and-a-half years.



Design and Implement Toll System

A toll system integrator (TSI) is the vendor that develops, installs, and operates the tolling hardware and software. To effectively procure a roadside TSI to ensure vehicles are properly identified and correct transactions are forwarded to the RCSC, the City will need to first develop documents with detailed system requirements and performance measures. Ideally, the City (with or through its tolling partner) will procure the roadside TSI first so the TSI can provide feedback to the civil infrastructure design team with tolling infrastructure needs. For instance, the roadside TSI will tell the civil design team where overhead equipment and roadside equipment cabinets will be optimally located.

Once the TSI is contracted, toll system development moves through several design and testing phases to ensure the system meets the contractual, functional, and performance requirements from the contract. A summary of these phases is below.

- **Preliminary system design:** Overview of system architecture and major system components to ensure the design meets contractual requirements, business rules, and system hardware and software requirements.
- **Factory acceptance test:** Tests performed in a controlled environment to verify functional and technical components have been correctly implemented. This test should exercise all aspects of system functionality, including system performance.
- **Final system design:** Detailed design that includes installation-ready plans based on as-built civil infrastructure and any necessary system modifications identified in factory acceptance testing.
- **Installation and commissioning:** Once civil infrastructure has been built, inspected, and accepted, the TSI installs all necessary equipment, including cameras, antennae, and roadside cabinets. After installation, each component is tested.
- **Operational test:** A complete test of the entire system under live traffic conditions over an extended test period. This test validates that the system can accurately create transactions and transmit the data for processing and revenue generation.
- **Go-live:** Official launch of the system and beginning of revenue collection.

Design and Construct Civil Infrastructure

After TSI procurement and toll system design has begun, civil infrastructure procurement and development begins in earnest. Some of the typical civil infrastructure needed for a congestion pricing program includes overhead gantries, concrete pads for equipment boxes, electrical power supply, camera poles, and underground conduit. Civil infrastructure contracts typically have the roles and responsibility of the civil contractor and TSI precisely demarcated.

Environmental Review and Approval

A congestion pricing program may require environmental approval during the civil design process. In particular, if Caltrans right-of-way is used for the project, then California Environmental Quality Act permitting is required and Senate Bill 743[32] will require Mountain View to assess the VMT impact of the project. The small physical footprint of toll equipment should minimize environmental impacts but environmental justice analyses may be needed to explicitly consider human health and environmental effects on low-income and minority populations.

Civil Construction

The civil infrastructure contractor will need to finish building most infrastructure before the TSI can install tolling equipment. A site turnover checklist between the civil contractor and TSI will help reduce miscommunication during this process.

Go-Live and Operations and Maintenance

After go-live, a congestion pricing system requires a long-term commitment to operations and maintenance. This includes roadway maintenance, toll operations, system operations, and enforcement.

- **Roadway maintenance of the toll equipment, software, and civil infrastructure.** Although the tolling equipment is typically the roadside TSI's responsibility, it is likely maintenance of civil infrastructure with be the City's responsibility.
- **Customer service toll operations** includes select customer service operations, as well as general management and oversight of the program. Although the BATA RCSC would likely manage most customer service interactions, it is possible that the City will be responsible for managing a database of North Bayshore residents for exemption purposes. The City will need to review the financial performance of the program, assess contract performance, and potentially manage investment of program net revenue.
- **Roadside system operations** includes processing toll transactions, maintaining back-end software, and system performance reporting. Most of this responsibility will fall to the roadside TSI. The City of Mountain View will need to review price settings and roadway performance.
- **Enforcement** may include law enforcement monitoring of occupancy discount eligibility. Other enforcement activities will likely be handled by the BATA RCSC and their contractors, including payment compliance through DMV registration holds for vehicles with unpaid bills.

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1 City of Mountain View. 2017. North Bayshore Precise Plan. p. 247. <https://www.mountainview.gov/civicax/filebank/blobdload.aspx?BlobID=29702>

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3 Bascome, Erik. September 23, 2021. “NYC congestion pricing: MTA reveals how much it could cost drivers.” Silive.com. <https://www.silive.com/news/2021/09/nyc-congestion-pricing-mta-reveals-how-much-it-could-cost-drivers.html>

4 Silicon Transportation Consultants.

5 California Toll Operators Commission. FasTrak Throughout California. <http://fastrak.org/FASTRAK>

6 This peer review included congestion pricing studies in Los Angeles, CA; New York City, NY; Portland, OR; San Francisco, CA; Seattle, WA; and Vancouver, BC.

7 Dynamic pricing is when the charge changes constantly, depending on the present amount of congestion. When there is more congestion, the price increases, typically to a price that is projected to eliminate traffic.

8 ADA stands for Americans with Disabilities Act of 1990. ADA is frequently used in transportation planning documents to describe projects or programs as they relate to the ADA.

9 California Streets and Highways Code, Division 16, Part 3, Chapter 18, Article 3, Section 27564 and 27565.

10 California Code of Regulations, Title 21, Division 2, Chapter 16.

11 Low-income drivers are defined as those living in households at 200% or below the federal poverty level. This aligns with the conceptual FasTrak START pilot program.

12 The study only included preliminary interviews with VTA staff and no agreements with regional agencies were made as part of this feasibility study.

13 The Rengstorff gateway capacity expansion project is proposed as a ramp realignment at Rengstorff Avenue/U.S. 101/Landings Frontage Road.

14 The Shoreline gateway capacity expansion projects are proposed and planned as a transit lane, northbound right-turn lane at Pear Avenue, and off-ramp realignment at Shoreline Boulevard/U.S. 101 northbound

15 Office space is assumed to host four full-time employees per 1,000 square feet. Housing is assumed to have 1.75 residents per dwelling unit, and 1.3 employed residents per dwelling unit.

16 City of Mountain View. May 2018. North Bayshore Residential Transportation Demand Management Guidelines. pp. 8-9. <https://www.mountainview.gov/civicax/filebank/blobdload.aspx?BlobID=31204>

17 In this evaluation, the driver of the vehicle is considered a passenger.

18 Internal Revenue Service. December 22, 2020. IRS issues standard mileage rates for 2021. <https://www.irs.gov/newsroom/irs-issues-standard-mileage-rates-for-2021>

19 We assume all a.m. peak period trips have a counterpart in the p.m. peak period. This means that 95% of p.m. peak period trips have a counterpart in the a.m. peak period.

20 Sources for these assumptions include: Puget Sound Regional Council, April 2008, Traffic Choices Study Summary Report, <https://www.nrel.gov/transportation/secure-transportation-data/assets/pdfs/traffic_choices_study_summary_report_2008.pdf>; Washington State Department of Transportation, September 11, 2012, Managing Congestion with Tolls on the SR 520 Floating Bridge, <https://www.ibtta.org/sites/default/files/Stone_Craig.pdf>; Kara M. Kockelman and Sukumar Kalmanje, 2005, Credit-Based Congestion Pricing: A Policy Proposal and the Public's Response, <https://doi.org/10.1016/j.tra.2005.02.014>.

21 In scenarios with a.m. inbound pricing only, the model assumes p.m. time shifting is reduced to 33% of that occurring in peak directional scenarios, as there is no direct price signal in the p.m. peak period to incentivize shifting p.m. travel times.

22 Modeling suggested that a minimum $3 charge may be effective at achieving the trip cap in a non-conservative scenario.

23 Bascome, Erik. September 23, 2021. "NYC congestion pricing: MTA reveals how much it could cost drivers." Silive.com. <https://www.silive.com/news/2021/09/nyc-congestion-pricing-mta-reveals-how-much-it-could-cost-drivers.html>

24 Maria Börjesson and Ida Kristoffersson. February 2017. The Swedish Congestion Charges: Ten Years On. pp. 20-21. <https://www.transportportal.se/swopec/CTS2017-2.pdf?source=post_page>

25 Treasure Island Transportation Management Act, AB 981, Chapter 317.

26 California Transportation Commission. 2021. Toll Facilities Program. <https://catc.ca.gov/programs/tolling/toll-facilities-program>

27 High-occupancy toll lanes, AB 194, Chapter 687.

28 California Constitution, article XIII C, section 1(e)(4).

29 California Streets and Highways Code, Division 16, Part 3, Chapter 18, Article 3, Section 27564 and 27565.

30 California Code of Regulations, Title 21, Division 2, Chapter 16.

31 California Streets and Highways Code, Division 17, Chapter 8, Section 31490.

32 Environmental quality: transit oriented infill projects, judicial review streamlining for environmental leadership development projects, and entertainment and sports center in the City of Sacramento, SB 743, Chapter 386.

CITY OF MOUNTAIN VIEW

NELSON NYGAARD

Sam Schwartz

SILICON Transportation Consultants