

Bay Area Fare Coordination and Integration Study

*Draft
Business Case Summary*



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1.

Introduction

Purpose of Study

This document presents a summary of the Business Case for Fare Coordination and Integration Study (FCIS). This study was launched in 2020 by the Bay Area's transit agencies and MTC to explore the following:

- » Do current fare policies suppress ridership and/or impede ridership growth for travelers that could make use of multiple operators?
- » Are there potential regional fare coordination and integration policies that can increase ridership?

The study was delivered through collaboration between the region's transit agencies alongside technical analysis that included modelling, public and stakeholder research, and policy research. This document is one of the key deliverables for the FCIS. It evaluates benefits, costs, risks, and requirements for six fare policy options to provide a technical evidence base to support decision makers in identifying a potential path forward for fare integration. The fare policies and options explored in this business case have been scoped and analyzed at a 'strategic level', meaning the document is intended to compare options and select policies for further review and development. Future studies will be required to refine the scope and impact estimates for options that are advanced to the next stage of development.

FCIS Scope and Time-lines

The FCIS accommodates the nine counties within the Bay Area and its 27 transit operators serving more than 1.7 million passengers per day. It also takes into consideration current conditions and future projections (which can be uncertain) related to transportation systems, policies, and projects. This document summarizes the study, its methodology, analyses, and findings that were carried out from July 2020 to September of 2021.

The work followed a six-stage project plan:

- » Problem Definition and Goals
- » Existing Conditions and Market Analysis
- » Identification of Barriers to Riding Transit
- » Alternatives/ Options Development
- » Alternatives Analysis/Business Case Evaluation
- » Reporting and Delivery Planning

Disclaimer on COVID-19

The COVID-19 pandemic has had a profound impact on transportation demand and travel patterns. The long-term impacts of the pandemic are currently unknown and there is insufficient data to accurately forecast their impacts. The study made use of ridership data and Clipper data from 2019 to inform all analysis and business case development. 19. As a result, they do not model the impact or potential long-term outcomes of the current global pandemic.

There is currently insufficient data or information available to allow the models employed in this business case to reasonably analyze the impact of the COVID-19 outbreak on this project or for the models to be used to comment on the expected changes in the forecasts described in this business case. Where possible, scenario analysis was used to assess the potential impacts of COVID-19 on study findings. Readers of this business case should consider its findings in this context and analysis included in this business case should be updated as pandemic recovery progresses.

Business Case Structure

The study was developed under a Business Case framework based on comprehensive insights that support and assess different fare integration and coordination policy options. The structure uses a systematic approach to understand benefits and risks tied to each of the options. Its objective is to support decision-making and investment-thinking for achieving fare integration.

The Business Case employs four dimensions to evaluate possible strategies: strategic, socio-economic, financial, and delivery and operations.

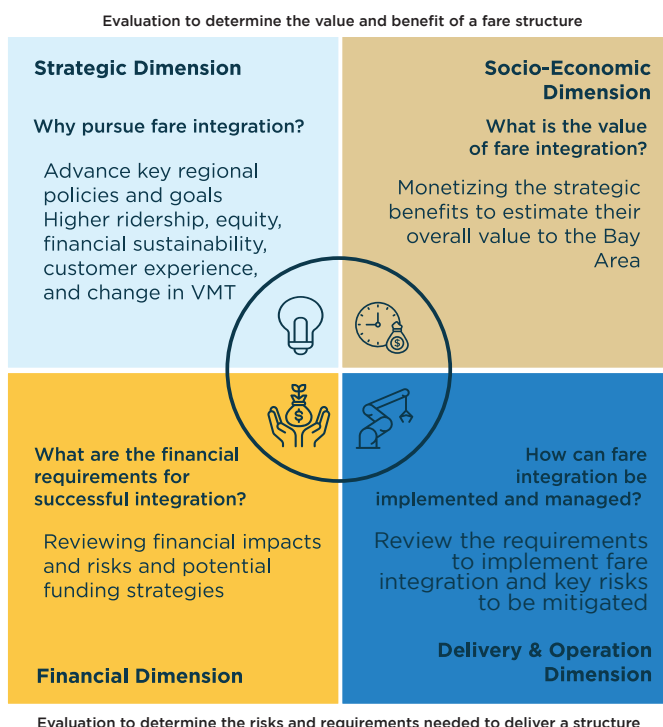
The Business Case used four approaches across all four dimensions, to weave a comprehensive analysis and determine a set of recommendations for each of the strategy options.

The approaches are:

- » **Forecasting and Modelling** - used for understanding how each tier or option could impact ridership revenues and potential wider benefits
- » **User Research** – used to inform how different tiers or options should be assessed, and solicit wider perspectives on fare structure change
- » **Stakeholder Engagement** – used to inform how different tiers or options should be assessed and solicit wider perspectives on fare structure change
- » **Agency Engagement** – used to inform how different tiers or options should be assessed and confirm key strategic, financial, and implementation considerations

The results of this methodology are meant to assess if a particular fare coordination and integration strategy is worth pursuing or not, based on its benefits and challenges. The Business Case is designed to support agencies with decision-making through a structured and comprehensive way.

Figure 1.1 Business Case Dimensions



How to use this document

The remainder of this document is composed by the following sections:

Chapter/Description	Questions Answered by Chapter
Section 2 The Case for Change – a summary of the central challenges fare integration could face and provides key data points that demonstrate the barrier exists	Is there a central problem that fare integration could address? Are there opportunities to increase ridership in the region that fare integration could action?
Section 3 Alternatives – a summary of the fare integration tiers and options included in the Business Case	What range of policies were considered? How were they developed?
Section 4 Strategic Case – an evaluation of how each tier or/and option aligns with policy goals regarding fare coordination and integration	What is the socio-economic value of the options? Do they increase regional welfare
Section 5 Economic Case – an evaluation of each tier or/and option based on the social value for local communities and the whole region	What is the socio-economic value of the options? Do they increase regional welfare?
Section 6 Financial Case – an evaluation that addresses the impact of fare integration to funding for transit policies and projects	What are the financial requirements for each option? What is the financial value for money (cost per new rider) of each option?
Section 7 Implementation Case – an evaluation of the requirements to successfully deliver each tier and/or option	What management, operations, infrastructure, and customer changes are required for each option? What are the risks for each option?
Section 8 Business Case Conclusions – a summary of the Business Case and its findings and recommendations	What are the consequences and trade-offs of each option? What did the study identify as potential next steps?



2.

The Case for Change

The Problem Statement

Fare policy is among several factors that have constrained the growth of transit ridership in recent years. Current fare policies are informed by funding and governance models that incentivize locally-focused fares. Each agency sets its own fare structure, prices, products, concessions, customer experiences' goals, and policies. These components, managed in an isolated manner, create barriers in terms of affordability and complexity of navigating the system, particularly for cross boundary and multi-agency trips, and limit the potential benefits of long-range investment and service plans. As a result, fare coordination and integration has a role to play in restoring transit ridership, supporting recovery from the COVID-19 pandemic, and delivering the transportation system the Bay Area needs for its coming decades of growth.

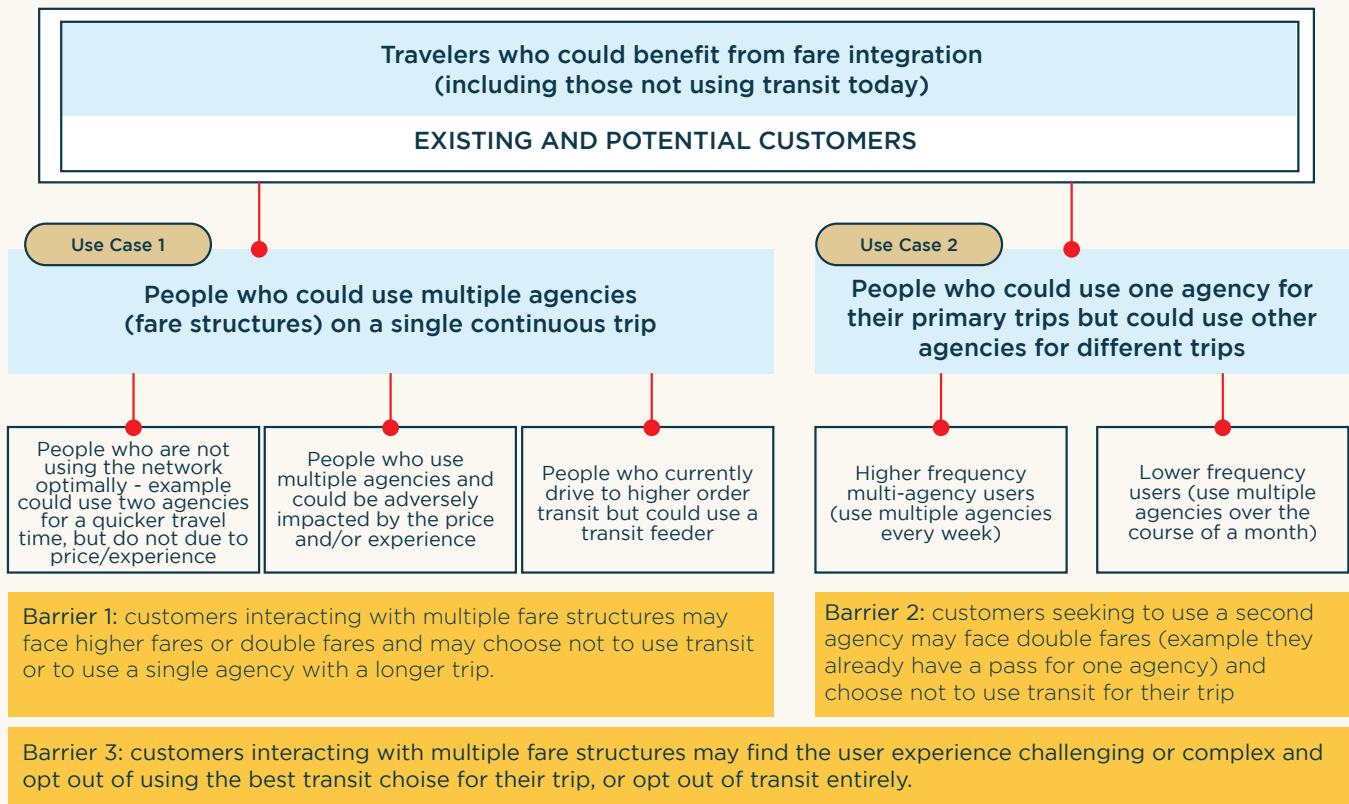
Figure 2.1 Four key Issues that impact ridership

	CUSTOMER VALUE	Current fare policies can lead to a disconnect between the fare charged and the value a customer places on their trip.
	PAYMENT EXPERIENCE	Current fare products, passes, payment technologies, and payment experiences may not be legible.
	EQUITY	Current fares may not consistently meet the needs of Equity Priority Communities.
	FUTURE TRANSIT	Current fares may not optimize the ridership and benefits of proposed transportation investments.

How does this problem suppress ridership?

These four fare barriers impact transit ridership through two general use cases:

Figure 2.2 Understanding Customer Experience through User Cases



Issue 1: Value

Analysis of travel behavior in the Bay Area combined with insights from user research provided the basis for understanding how customers value transit in the Bay Area. Pre-covid transit data showed that while only a small percentage of the region's transit users interact with multiple fare systems, the barriers faced are nevertheless complex and significant.

According to survey and Clipper data, less than 10 percent of daily transit riders transfer between operators within a single trip. Over the course of a day, about 14 percent use multiple operators. The majority of riders use BART, Muni and AC Transit as their primary operator.

Only about 1 percent of daily Clipper cards interact with more than two agencies (primary agency plus two additional). Therefore, very few people are making transfer likely to use more than one operator daily.

Transfer patterns indicate that pre-Covid riders were using feeder service to access regional services like BART and Caltrain.

- » 20 percent of transfer trips occur between BART and Muni
- » An additional 10 percent of transit trips occur between AC Transit and BART
- » 6 percent of transfer trips occur between Muni and Caltrain

Although a smaller percentage of total transfer trips in the region, customers in the East Bay, Napa Solano region, and Union City are also more likely to use more than one operator daily. Clipper analysis indicated that more than 20 percent of the customers riding these services used one or more operator.

Figure 2.3 Daily Clipper Card Usage on Single and Multiple Operators (Source: Clipper Data, 2019)

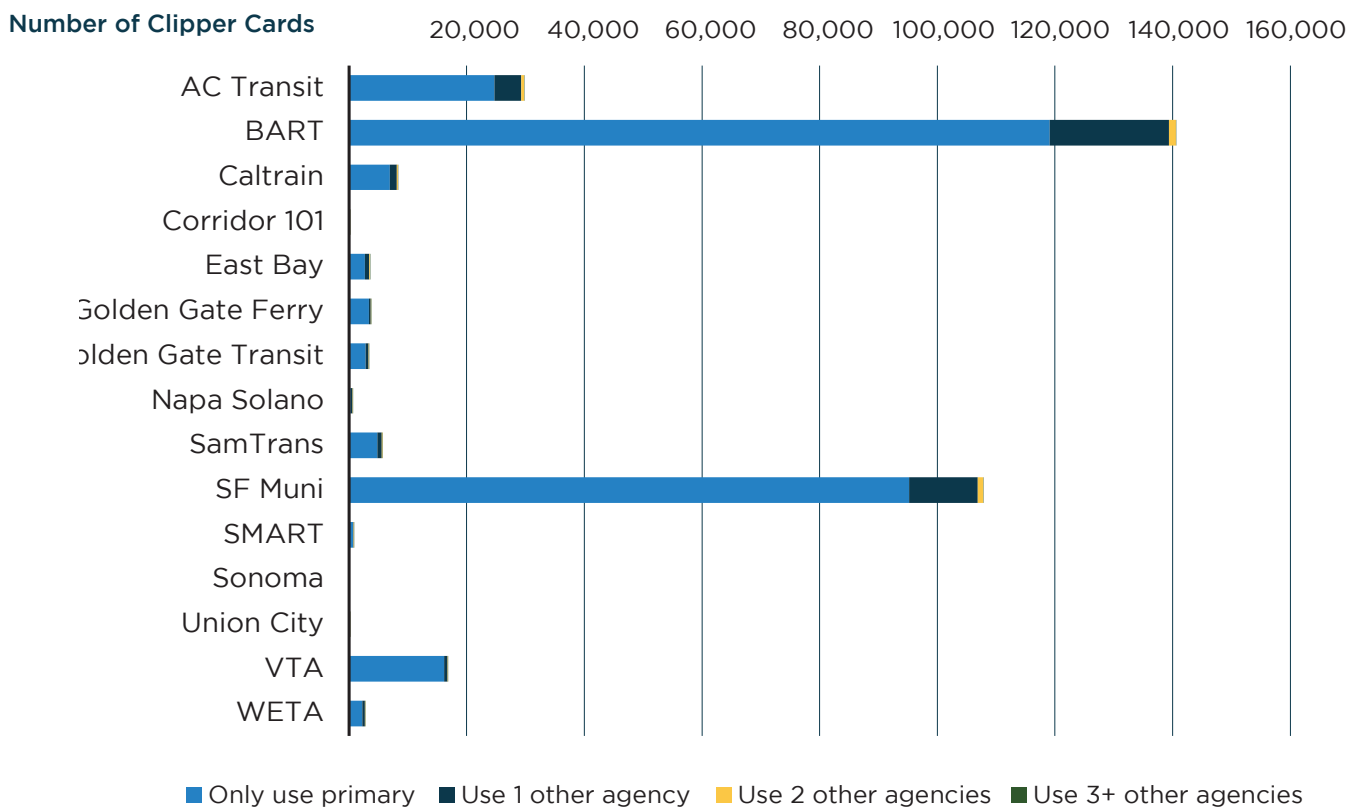
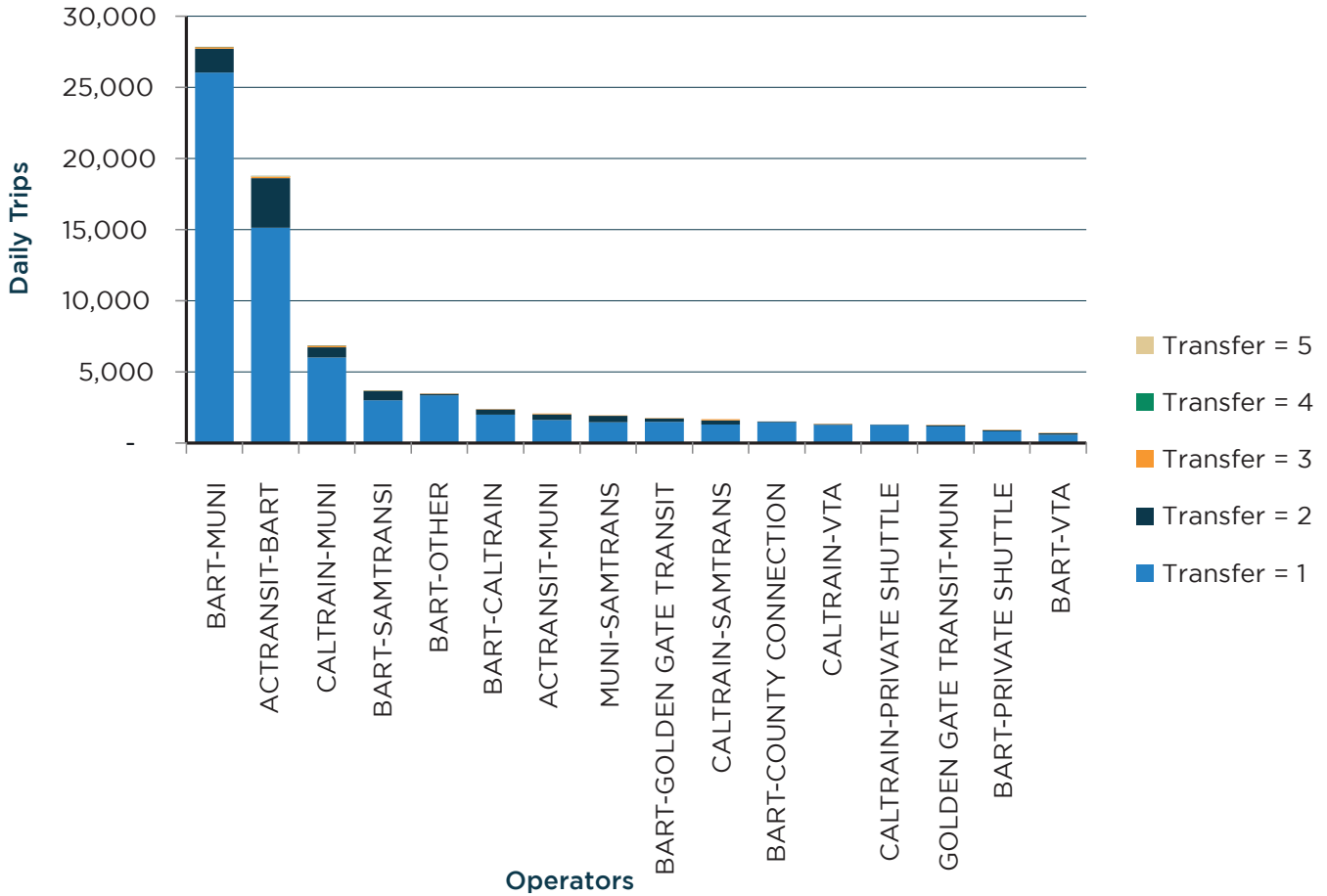


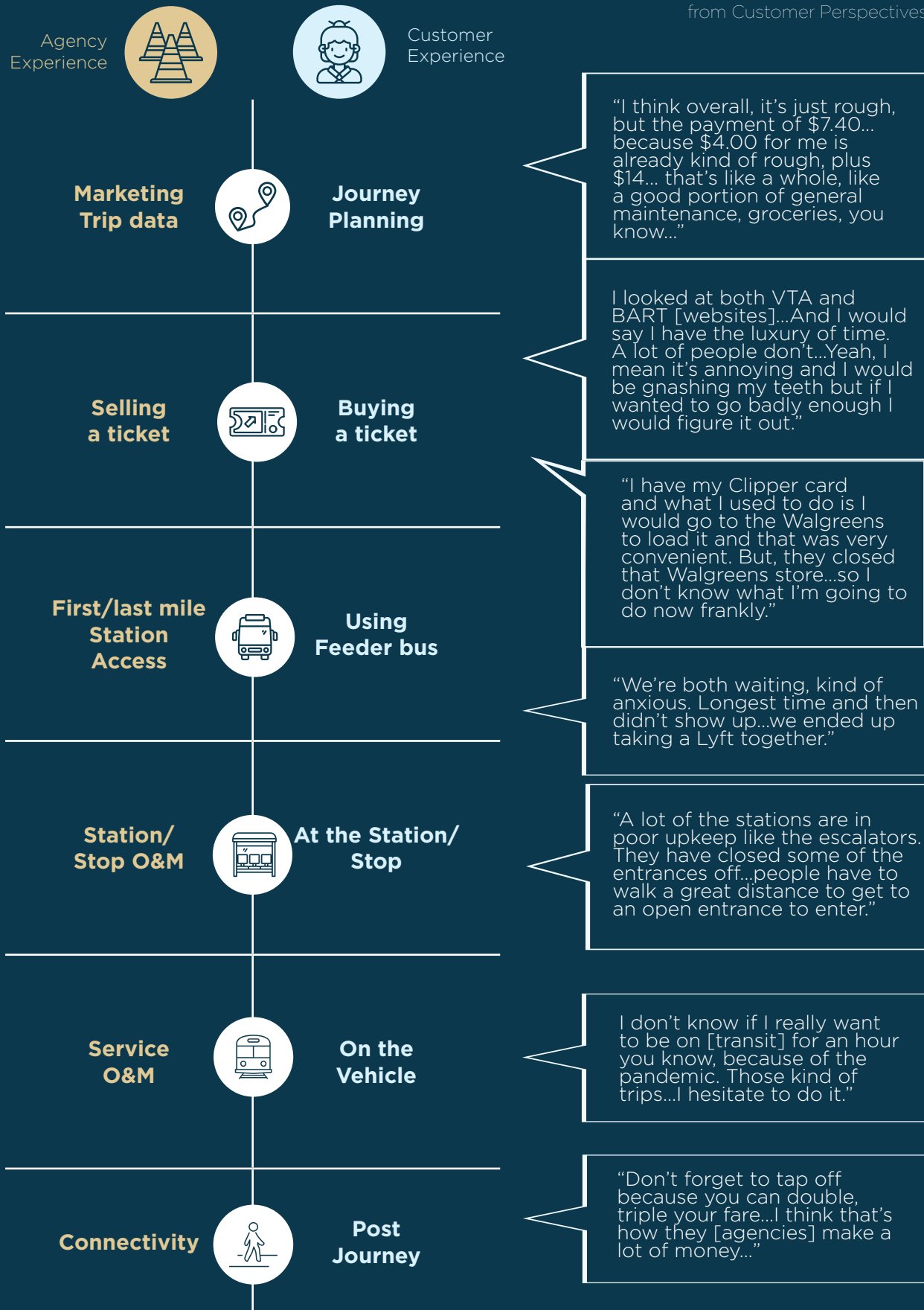
Figure 2.4 Number of transfers between operators by agency (Source: MTC Onboard Survey, 2015)



Issue 2: Customer Experience

User research showed that transit riders determine the value of transit in relative terms to other modes and other experiences. Reliability was most often cited as the most important determinant of customer value. Nevertheless, user testimonials suggest that fares can play a significant role in increasing affordability and usability for transit riders.

Figure 2.5 Understanding Customer Fare Barriers from Customer Perspectives



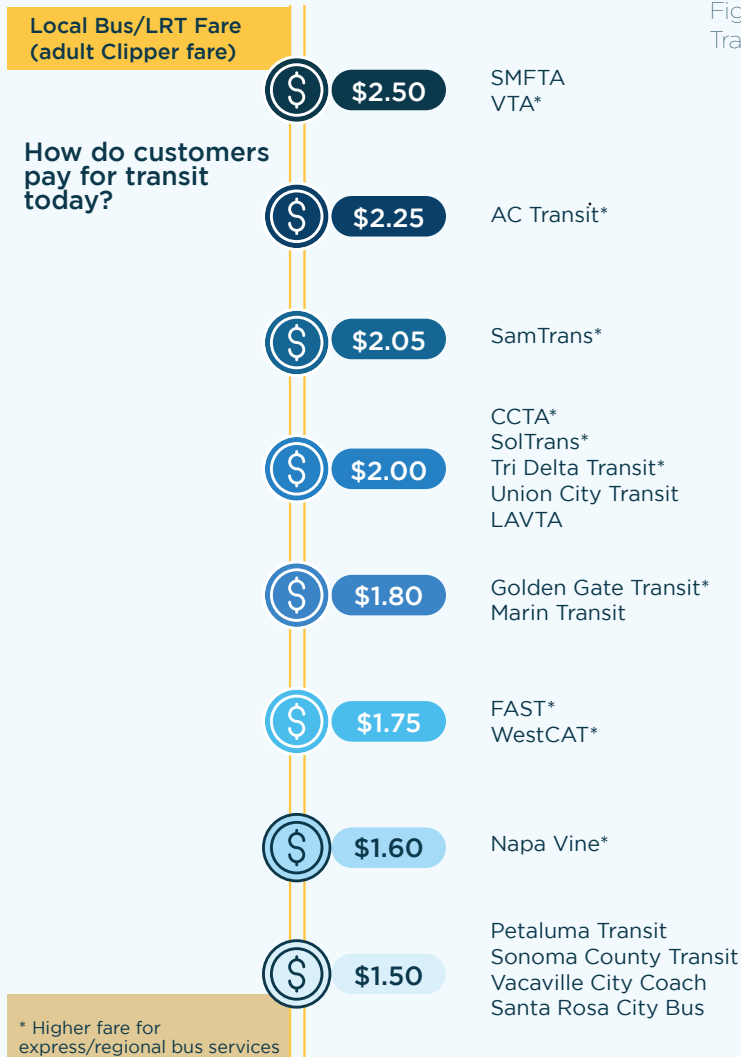


Figure 2.4 Overview of Current Transit Fares and Products

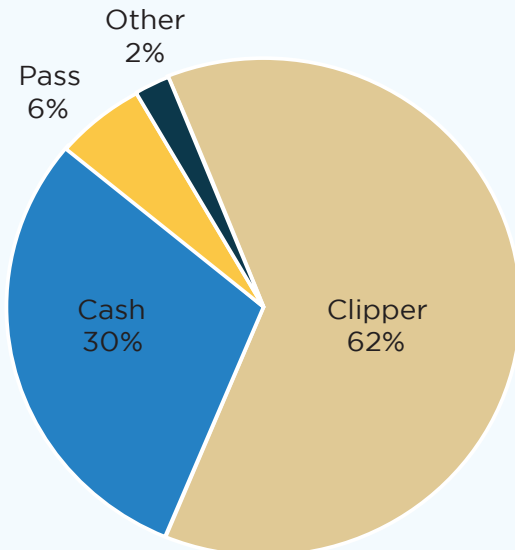
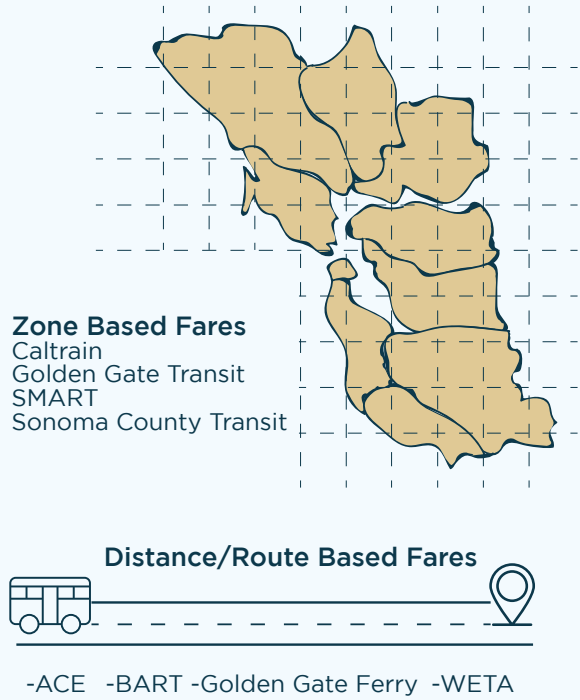


Figure 2.6 Fare Product usage
Source: MTC Onboard Survey, 2019)

Issue 3: Equity

Fare barriers have a disproportionate impact on vulnerable populations, which can include low-income individuals, people of color, people with disabilities, older adults/seniors, and “transit dependent” people who have low rates of vehicle ownership. Nearly half of Bay Area transit riders qualify as low income and they also make the majority of transfer trips.

- » Roughly 48 percent Bay Area transit users report an annual household income of less than \$50,000 and more than 60 percent of riders are non-white/minorities.
- » The share of low-income and minority riders varies by transit agency. Nearly 99 percent of riders on Santa Rosa Bus and City of Rio Vista qualify as low-income compared to roughly 30 percent of riders on BART. More than half of Bay Area agencies serve a majority low-income customer base.

- » SFMTA Muni service alone accounted for nearly half of all boardings by low-income persons.
- » Thus, some agencies may serve a disproportionately low-income customer base, other agencies provide the most transit rides for low-income transit riders in the region.

Transit riders who qualify as low-income make roughly 52 percent of transfer trips that include one transfer. The percentage increases to 57 percent for transit riders make three or more transfers.

By definition, transit costs incur a higher cost-burden on low-income transit riders. Pass products and concessions can be designed to make transit more affordable; however Bay Area pass products typically require payment up-front, which can be challenging. As a result, many low-income riders still opt for cash payment and therefore don't benefit from the Clipper discounts.

Figure 2.7 Share of annual boardings by low-income transit riders by agency (Source National Transit Database, 2019)

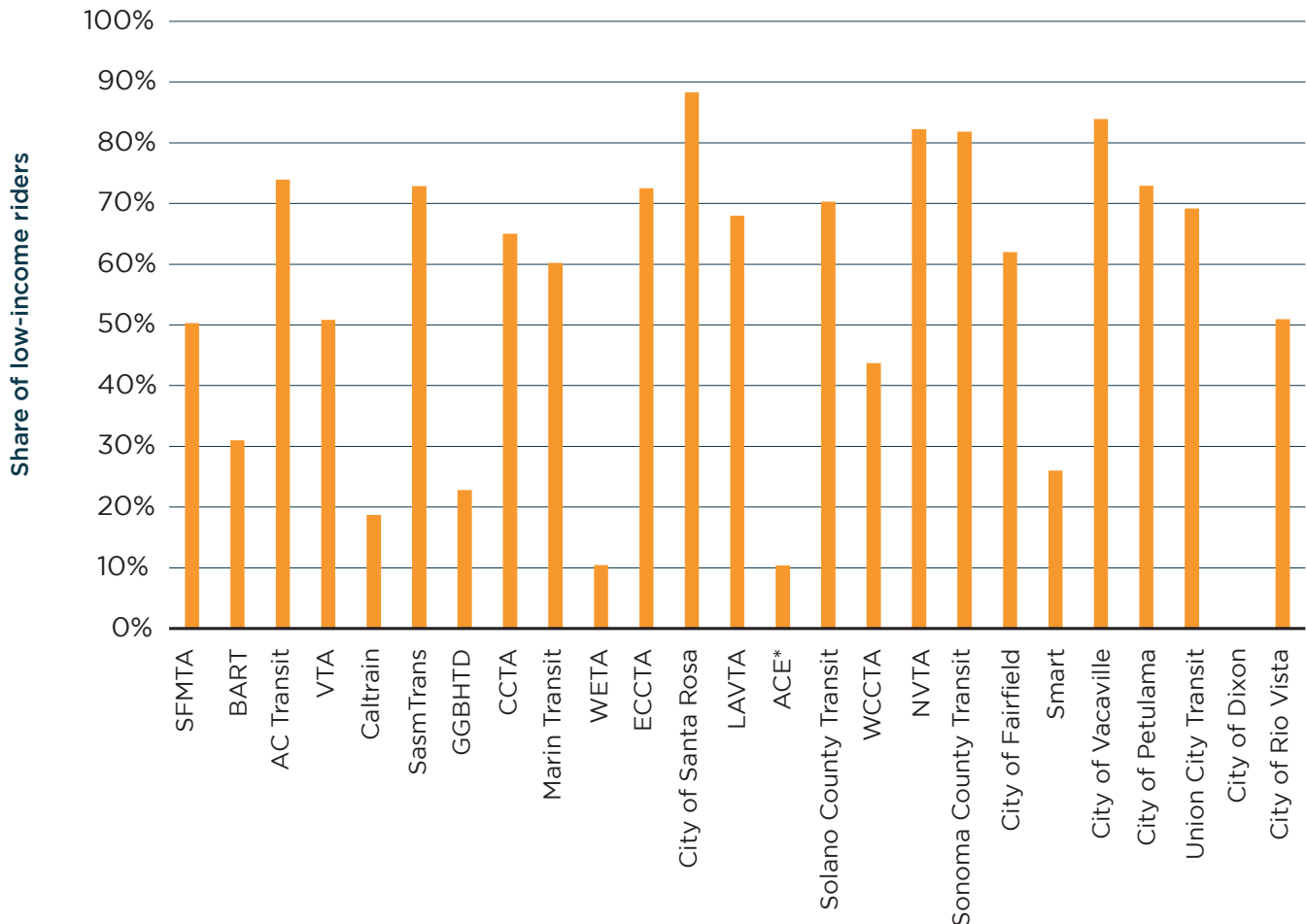
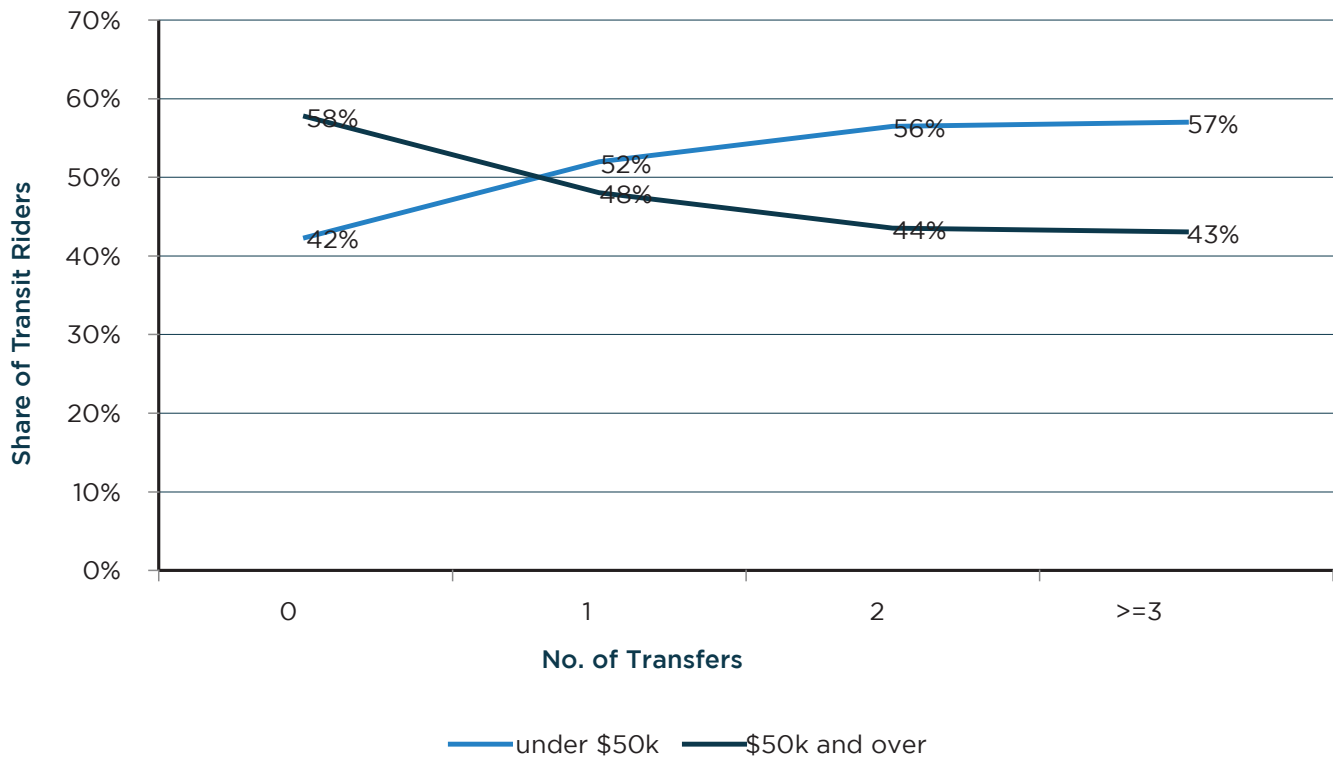


Figure 2.8 Percentage of transfer trips by household income (Source: MTC Onboard Survey, 2015)



In addition, the challenges of affordability were well-documented in the user research among low-income transit riders.

When pursuing fare integration, special attention needs to go into fare changes or increases, and technology-based approaches (such as relying solely on apps or cards) to assure that vulnerable groups are not affected by the implementation of strategies, on the contrary, they should be benefited from them.

Issue 4: Future Transit

Fare integration has the potential to help optimize future transit investments and alter future transit service design and delivery. The study considered how a selection of projects proposed under Plan Bay Area 2040 and explored how each investment could produce a better return on investment based on fare integration's potential to augment ridership.



3.

Alternatives

Fare Integration Tiers

The fare integration business case evaluated six different policy options organized into four tiers of integration. Policy options were intentionally selected to demonstrate the range of integration approaches available, spanning those that required minimal change to existing fare structures and policies at individual agencies as well as those requiring more dramatic transformation.

The tiers illustrate how changes to local and regional fare structures may unlock new benefits for the Bay Area. Each tier builds upon the previous tier with further changes. Tier 1 could be applied to the existing fare structures in the region or as part of each higher tier.

	Tier 1: Overlays to the existing fare structure	Tier 2: Free and Discount Transfers	Tier 3: Regional Change	Tier 4: Regional and Local Change
Changes to Fares	Explored benefits of introducing new pass and cap products to the existing system or as part of other tiers.	Explored benefits of adding free and discount transfers for multi-agency trips, eliminating double payments.	Explored the additional benefits that could be unlocked by bringing regional services under one unified fare structure, while maintaining a region-wide system of transfer discounts.	Explored significant changes to both regional and local fares through introduction of new concepts such as cellular zones and unified flat fare for local services throughout the region.
Changes to Agency Control of Fares	No changes to agency authority, new passes or products could receive funding	No changes to agency authority, discounts could receive funding	Regional agencies would either agree to fares or a central entity could control fares	Would require all agencies to agree to a single fare formula or for a centralized entity to control fares

Alternative Development Process

The Alternative Development process began with the identification of roughly 20 fare policies, which were refined through an initial screening to the final six policies described below for further evaluation and testing. The shortlist screening process eliminated options based on high-level criteria:

- » Whether the policy addressed existing fare barriers or created new ones
- » Improved customer experience
- » Equity impacts
- » Support for future transit investments
- » Challenges in delivery

Examples of policy options that were not considered as a result of this screening include:

- » Fare by distance on all regional and local modes: presented technical challenges for delivery and would have negative operational impacts on local buses.
- » Corridor pricing: potential to create further equity issues and does not fully address study problem statement.

The final six policy options were determined to be viable approaches based on the initial screening and were recommended for further testing and evaluation. Multiple of variants of each policy were tested through modelling using the MTC Transportation Model 1.5 as well as off-model Clipper analysis.

Tier	Policy Option	What was tested	Examples
Tier 1: Overlays to the existing fare structure	Option 1.1 Individual Pass ("Puget Pass" Modell)	<p>Policy Option 1 included multiple pass/cap variations:</p> <ul style="list-style-type: none"> » Trip-based caps (daily, weekly and monthly) assuming local to regional transfers free » Value-based caps (daily, weekly, and monthly) assuming local to regional transfers free » Tiered pass products (local only, all-inclusive) » Individualized monthly pass (Puget Pass) based on customer's preferred trip, multiplied by factor of 36. Customer pays difference when making trips that exceed this preferred trip value. 	<ul style="list-style-type: none"> » Monthly trip cap of 35, 40 or 50 trips on any local or regional service. Trips over this amount are free. » Daily value cap of \$5, \$10 or \$15 on any local or regional service. Trips over this amount are free. » Individualized monthly pass set to \$4 trip value. Monthly pass is \$144; customer only pays additional fare for trips valued over \$4.
	Option 2.1 No-cost transfers (local/local, local/regional)	<p>Policy Option 2 applied a 100% discount for transfers from local services to other local services and from local services to regional services.</p>	<ul style="list-style-type: none"> » Free transfer from SamTrans local service to VTA local service (pay only one fare) » Free transfer from AC Transit local service to BART (pay only BART fare).
	Option 2.2 No-cost transfers (local/local, local/regional, regional-regional)	<p>In addition to the local to local and local to regional discount included in Option 2, this policy applies a discount for transfers between regional operators.</p>	<ul style="list-style-type: none"> » Discount (no cost) transfer from Caltrain to BART » Discount (no cost) transfer from regional bus to ferry
Tier 3: Regional Change	Option 3.1 Unified Fare by Distance for Regional Service Only	<p>Under Policy Option 3b, regional rail, bus and ferry services were unified under a common fare by distance curve.</p>	<ul style="list-style-type: none"> » Caltrain-BART trip is priced based on the BART price per mile. » WETA-Muni trip is priced per mile for ferry, with a free transfer to Muni services.
Tier 4: Regional and Local Change	Option 4.1 Unified Fare by Distance for Regional Services + Local Fare	<p>Fare Policy Option 4 applied a single fare by distance curve to all regional operators and introduced a local flat fare based on the weighted average. No transfers fees were applied when transferring from local to regional services.</p> <p>Multiple subsidy scenarios tested.</p>	<ul style="list-style-type: none"> » Caltrain-BART trip is priced based on the BART price per mile. Transfers to/from local bus services are free. » For a local bus trip using SamTrans and Muni service, customers play a single flat fare.
	Option 4.2 Small zones for all service	<p>Fare Policy Option 5 applied a cellular zone concept (81 total zones) to all regional and local services.</p> <p>Multiple subsidy scenarios tested: \$100m/year, \$70m/year, 12.5m/year.</p>	<ul style="list-style-type: none"> » Trips on AC Transit and BART services are priced by number of zones travelled. » Trips on a single local operator like Santa Rosa Bus or SolTrans are also priced by number of zones travelled.
	Option 4.3 Large Zones + local flat fare	<p>Fare Policy Option 6 applied a larger zone concept (36 zones) to regional service providers and introduced a local flat fare based on the weighted average.</p> <p>Two levels of subsidy tested.</p>	<ul style="list-style-type: none"> » For trips on AC Transit and BART services, customers pay for BART trip based on number of zones travelled. Transfer to/from local AC Transit service is free. » Trips on a single local operator like Santa Rosa Bus or SolTrans are priced by a region-wide local flat fare.









4.

Strategic Case

Summary of the Strategic Case

The Strategic Case evaluates each option using four “strategic dimensions” based on the stated policy goals for fare coordination and integration. The four strategic dimensions used in the strategic evaluation are:

- 
Ridership Development – assessing the extent to which each option can increase ridership by removing fare integration barriers;
- 
Vehicle Miles Traveled (VMT) Reduction – assessing how each option supports regional and State goals for VMT reduction;
- 
Equity Impact – assessing the impacts and benefits of each option to equity policies and objectives; and
- 
Customer Experience – assessing how each option will impact traveler experience.

Strategic Evaluation

Fare Integration has the potential to increase daily ridership by 11,500 to 30,200 with low investment and by 44,000 to 68,800 with high levels of investment.

Benefit 1: Increased Ridership

What is the benefit?

This benefit assesses the extent to which each option and tier generate increased ridership in the Bay Area. This involves a review of changes to total trips in the region as well as a review of trips within a single county (intra-county) and between counties (inter-county). This benefit was analyzed using the regional transportation model.

Option Comparison

Each of the fare integration options were analyzed by tier to determine their impact on ridership for both the Bay Area (Figure 4.1) as well as inter- and intra-county trips (Figure 4.2).

Figure 4.1 Ridership Development - Bay Area Wide Perspective

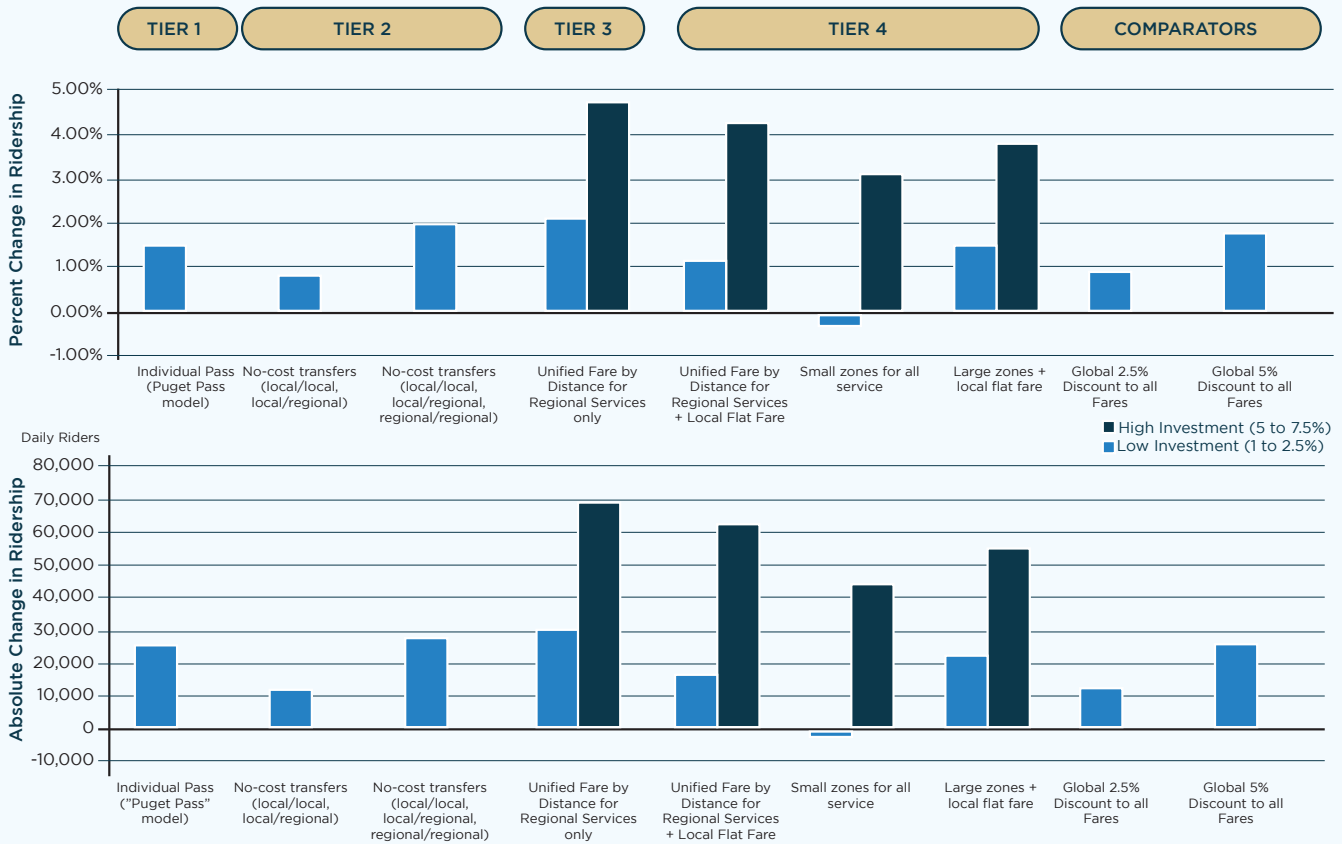
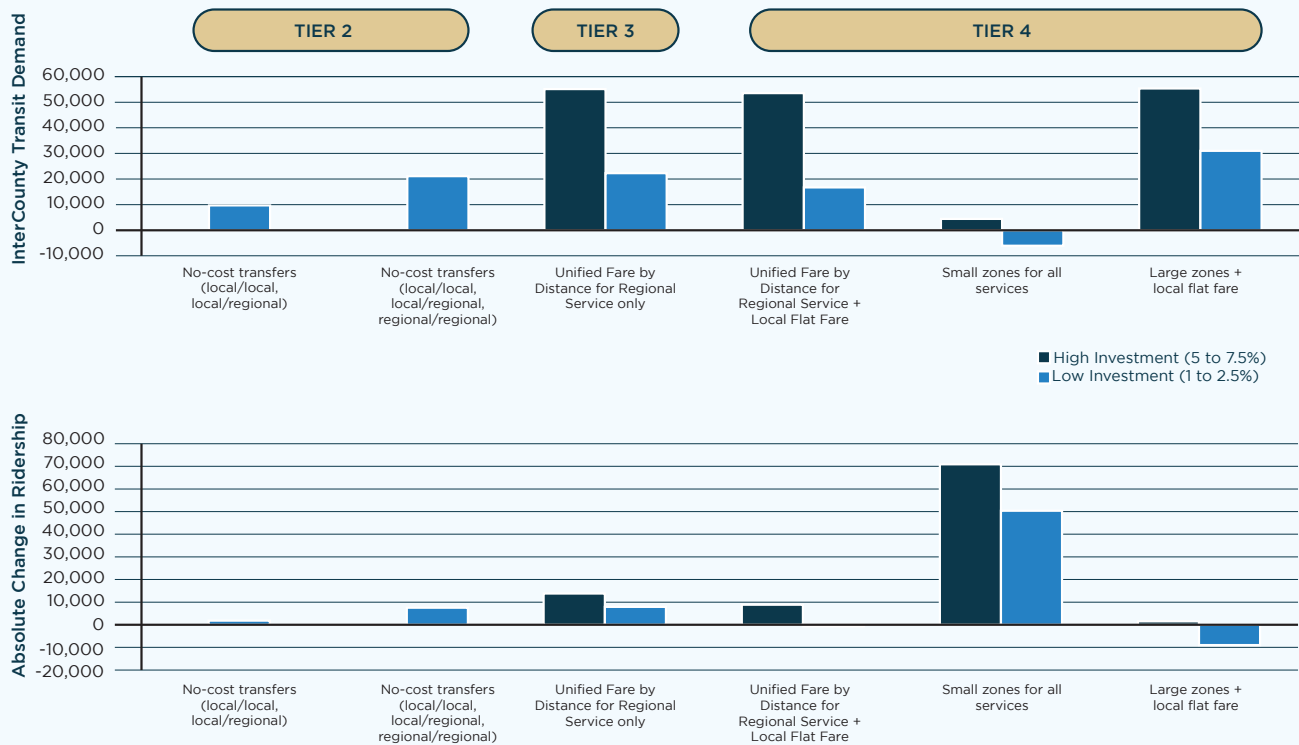


Figure 4.2 Ridership Development - Inter and Intra County Trips



Key Insights on Benefit 1

Figure 4.1 note the following conclusions for region-wide trips:

- » Low Investment: As shown in Figure 4.1, options in Tiers 1 and 2 only impact customers who face an integration price barrier and can generate between 0.75% to 2% more ridership with a low level of investment. These options have a ceiling for ridership growth compared to higher tiers because they do not directly impact trips that do not use multiple agencies. Tier 3 can generate comparable ridership as Tier 2 (2%) at low investment, while Tier 4 tends to generate lower levels of ridership (range of ridership losses to a 1.5% gain).
- » High Investment: Tier 3 has the highest ridership potential of the options (+4.7%) as it allows seamless use of all regional services along with free transfers between local and regional services. Tier 4 tends to perform poorer as it requires price changes for local services that may lead to ridership losses on some local operators (total impacts range from +3% to 4.2%)

Figure 4.2 notes the following conclusions for intercounty trips:

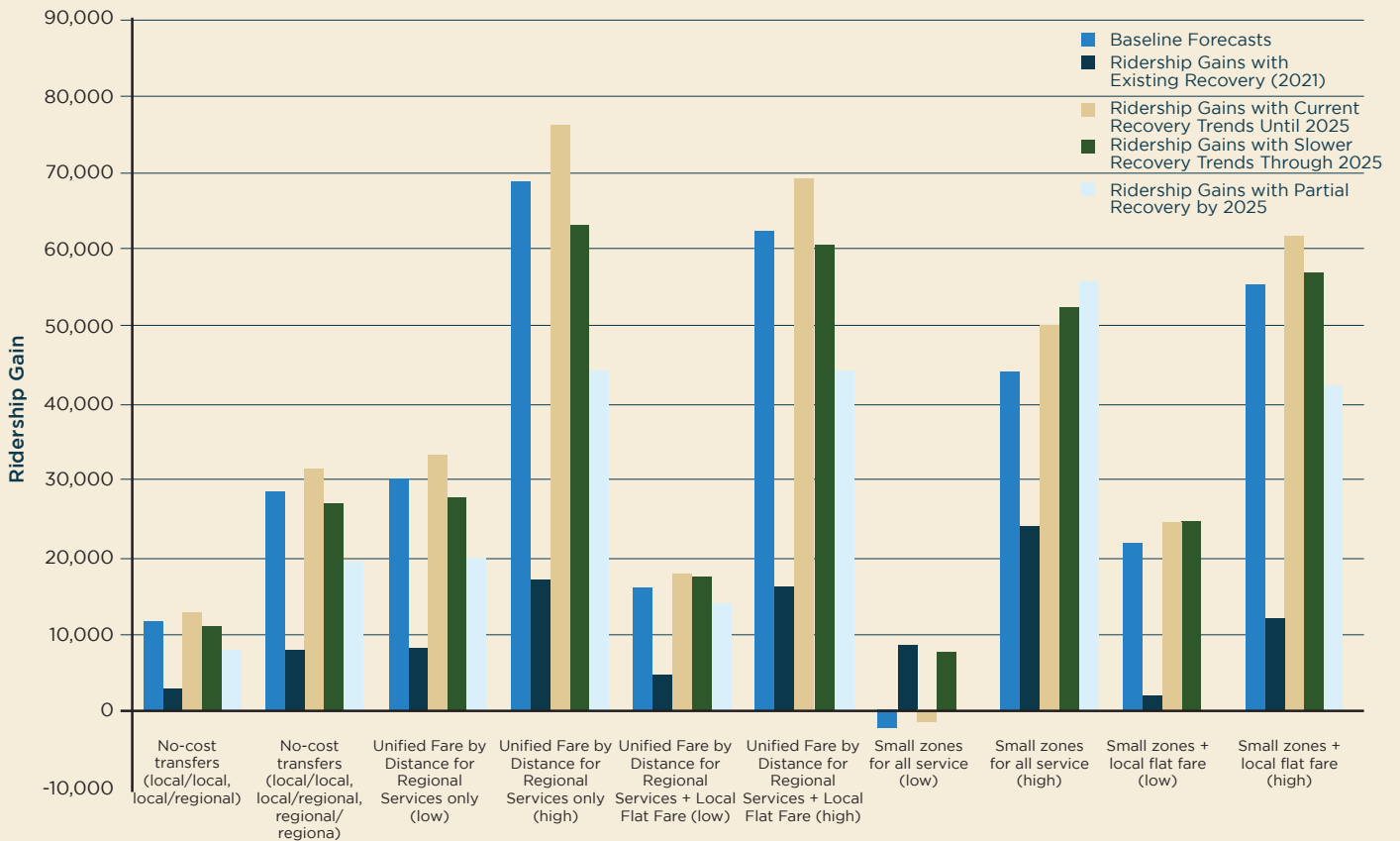
- » As seen in Figure 4.2, no cost transfer options (Tier 2) promote inter-county ridership (~11,000 to 25,500 passengers per day) with limited intra-county gains.
- » At a high level of investment, Tier 3 generates nearly 69,000 new riders per day of which 55,000 are inter-county trips. With low investment this option can generate 30,000 trips a day, of which 22,000 are inter-county.
- » At \$70 million per year of new subsidy, small zones for all services generates intra-county and/or singer operator ridership (about 50,000 trips per day). This option loses ridership at lower levels of subsidy, and with high subsidy gains intra-county but loses inter county ridership.

COVID-19 Recovery and Integration Ridership

A set of COVID-19 recovery scenarios were developed to explore how different extents of recovery by 2025 could impact option ridership gains. Figure 4.3 illustrates ridership gains for five scenarios:

1. Baseline ridership forecasts
2. Ridership gains if the option was delivered with existing extent of recovery
3. Ridership gains if recovery continued a similar trajectory as today until 2025
4. Ridership gains with a slower recovery (recovery rates are 50% of what has been observed)
5. Ridership gains with a partial recovery (no are in the Bay Area is 100% at 2019 levels by 2021).

Figure 4.3 COVID-19 Recovery and Integration Ridership



This assessment illustrates that lower levels of recovery has more severe impacts to performance for options with higher inter-county travel (unified fare by distance, with large zones).

Benefit 2: Vehicle Miles Travelled Reduction

Fare Integration has the potential to reduce regional vehicle miles travelled by 120,000 to 260,000 a day with low investment and by 170,000 to 847,000 under high investment.

What is the benefit?

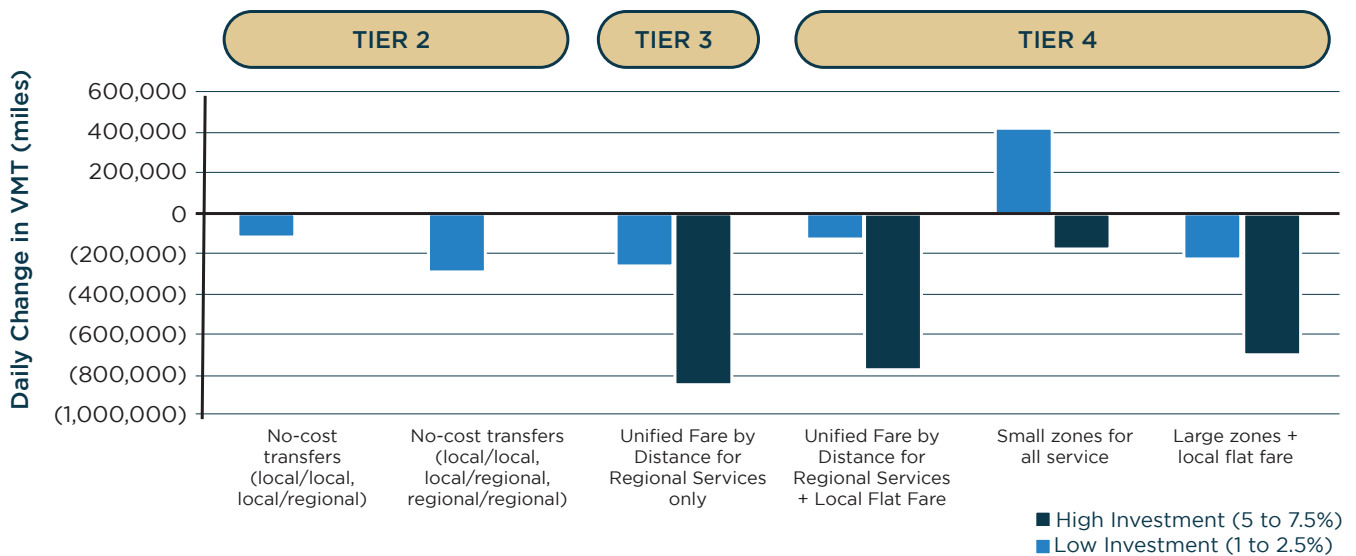
Reducing vehicle miles travelled (VMT) is a key policy theme at the local, regional, and State level. VMT reductions vary between options based on the types of trips that are generated by fare policy changes.

Option Analysis

Figure 4.4 shows the VMT reduction per tier option.

As shown in Figure 4.4, Tier 2 and Tier 3 tend to have higher VMT reduction per new trip because most trips are longer distance trips using a combination of regional and local modes. Unified fare by distance options have the highest VMT reduction as their ridership growth is focused on the regional network and includes longer distance travel. The small zones option generates mostly shorter distance Muni trips and has a net loss of about 6,000 inter-county trips, so its impact on VMT is lower.

Figure 4.4 Vehicle Miles Travelled Reduction



Benefit 3: Equity Impact

What is the benefit?

The strategic evaluation also takes into consideration the equity impacts of different fare structures, by evaluating quantitative data provided by the TM 1.5 model outputs to determine how travel behavior varies by household income groups:

- » How would new subsidy be distributed between household income groups?
- » How are fare increases distributed between household income groups?
- » How are fare decreases distributed between household income groups?
- » Do the fare structures change the modes used by travelers based on household income?

Option Comparison

Model outputs were analyzed to understand how dollars invested in lower fares were distributed among income groups, as shown in Figure 4.5.

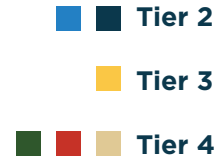
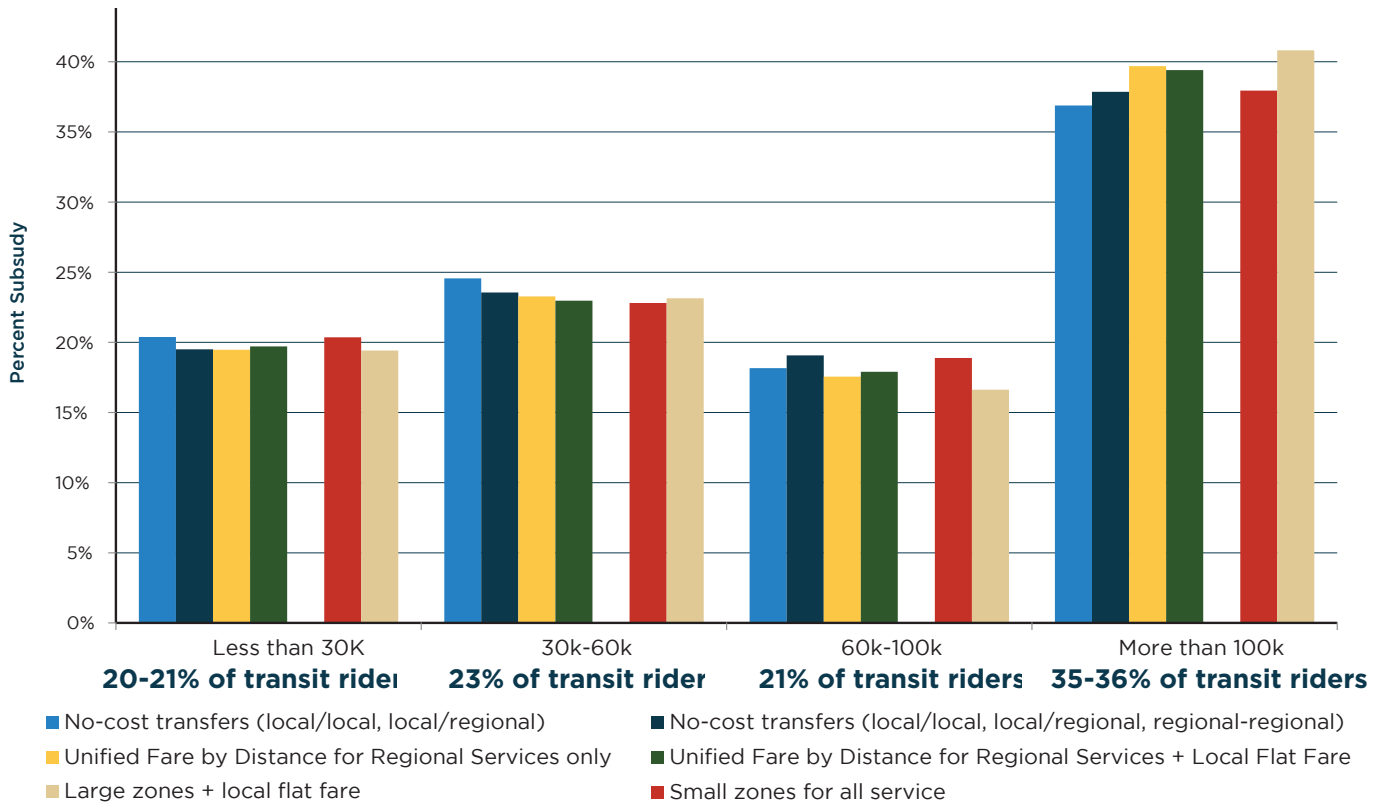


Figure 4.5: Equity Impact - Share of Subsidy Compared to Share of Ridership



Level of subsidy invested in each income band only varies slightly between options. Generally, level of subsidy aligns with proportion of riders in each income category, with the exception of \$60,000-\$100,000, where investment is lower than the proportion of riders in this category.

Fare Increases Across Income Groups

This assessment focused on the number of customers paying more under each option and their average fare increases. Fare increases and decreases can be attributed to shift in mode (for example, from bus to rail) as well as increases in the price of the trip on a specific mode.

Figure 4.6 Percent of Riders Experiencing Increase in Fares

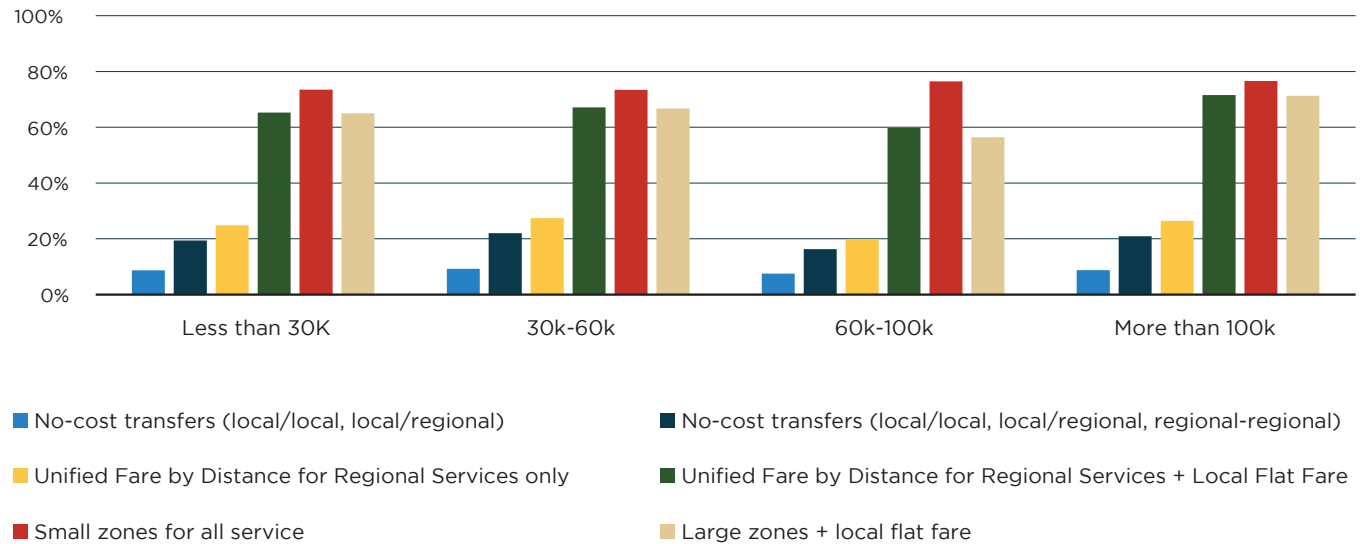
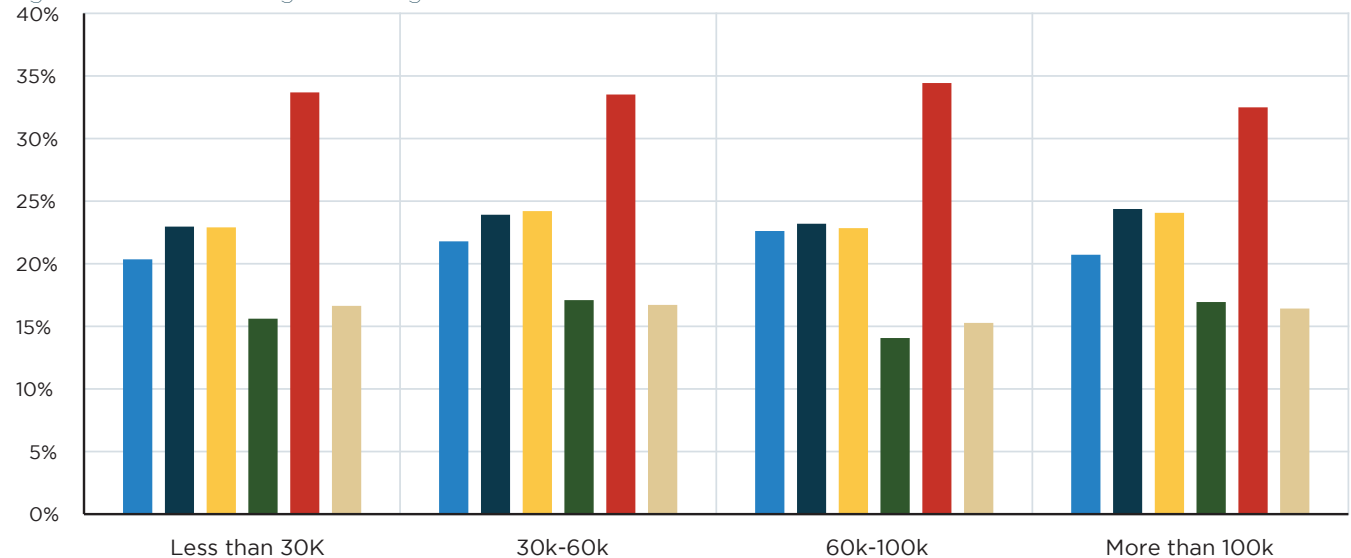


Figure 4.7 Percent Change in Average Fare Increases



This assessment notes that:

- » Tier 4 options tend to have more customers across all income groups paying more. The small zones option also shows the steepest increase in average fares (more than 30 percent) in comparison to , however unified fare by distance with a local flat fare and large zones with a local flat fare have lower average fare increases than lower tiers and small zones which each saw a roughly 15 percent increase in fares.
- » Tier 4 options tend to have more customers paying more in the lower income bands than the higher income bands.
- » Tier 3 results in fewer customers than Tier 4 paying more, with impacts that are generally consistent across the income groups.

Fare Decreases Across Income Groups

This assessment focused on the number of customers paying less under each option and their average fare decreases, as shown in Figure 4.8 (number of customers receiving a fare decrease) and Figure 4.9 (average percent decrease in fare for customers receiving a decrease).

Figure 4.8 Percent of Riders Experiencing Decrease in Fares

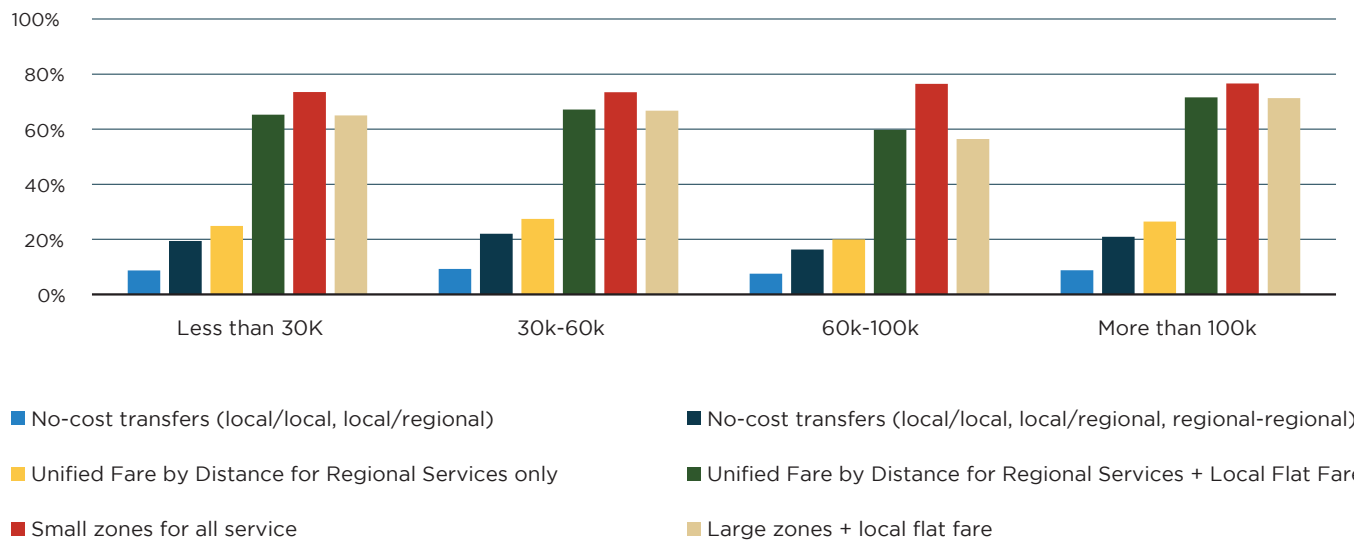
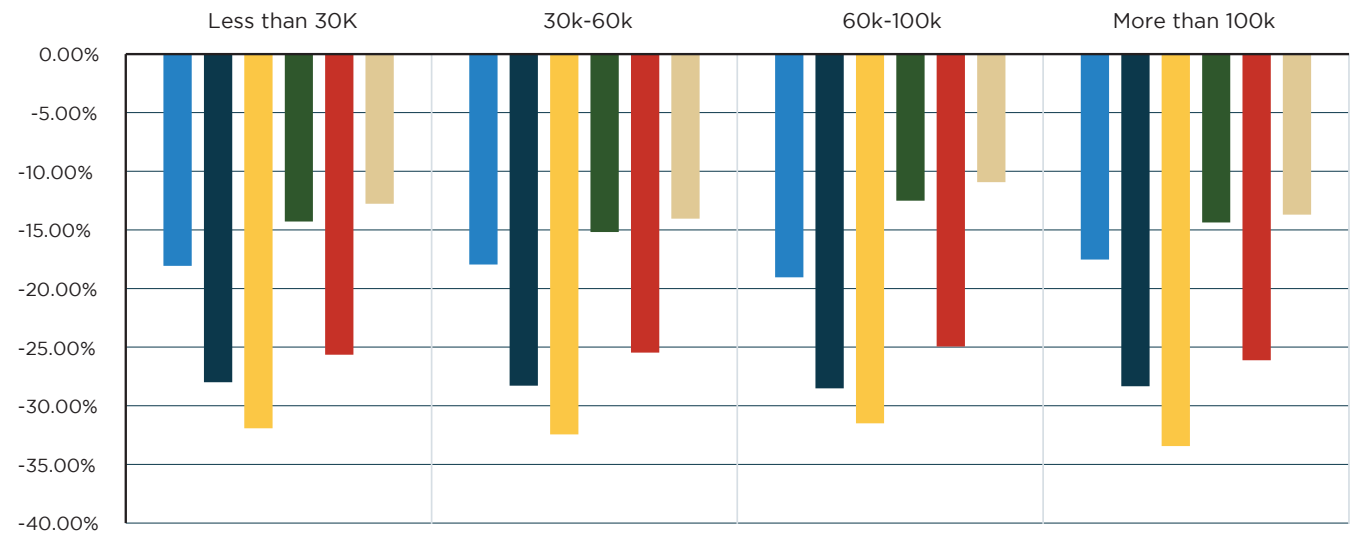


Figure 4.9 Percent Change in Average Fare Decreases



This assessment notes that:

- » Tier 4 options tend to have more customers paying less, with the number of customers paying less equally distributed between income levels
- » Tier 2 and Tier 3 have fewer customers paying less but offer greater fare reductions than Tier 4

Mode shift across income groups

Additional analysis was conducted to understand how mode choice changed because of fare policies, specifically whether changes could make rail services more accessible to lower income riders, as shown in Figure 4.10 (passengers changing from bus to rail) and Figure 4.11 (passengers switching from rail to bus).

Figure 4.10 Percent of Transit Riders Switching Modes (Bus to Rail)

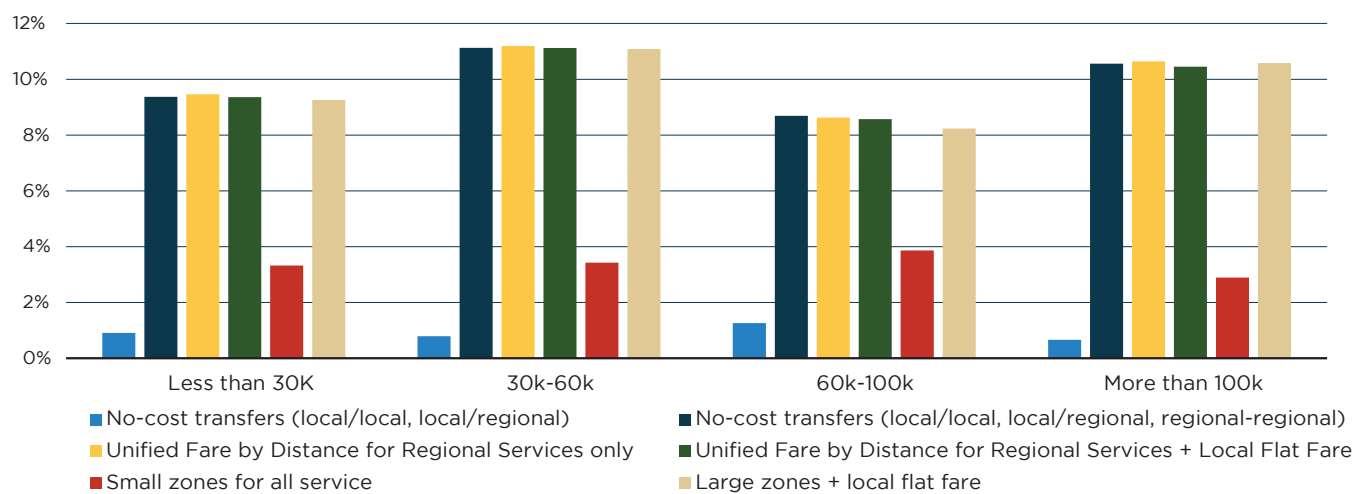
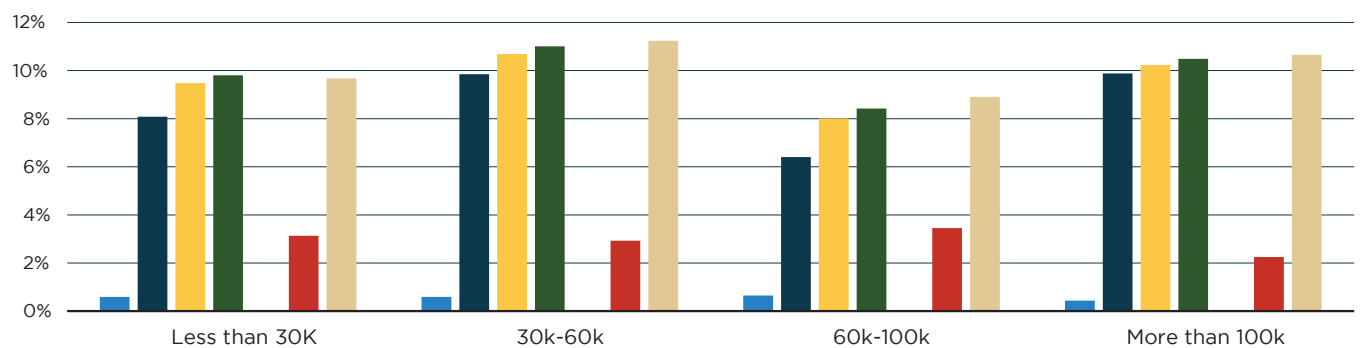


Figure 4.11 Percent of Transit Riders Switching Modes (Rail to Bus)



As seen in Figures 4.10 and 4.11, for Tier 2, more people switched from using bus to rail than from rail to bus across all income groups. This pattern continues for Tiers 3-4, except for the lowest income group. For Tiers 3-4, the “Less than \$30k” were slightly more likely to switch from rail to bus (0.01% to 0.40% more switching to bus).

Benefit 4: Enhanced Customer Experience

What is the benefit?

The problem statement for the FCIS identified customer experience as a key integration barrier. The FCIS team worked extensively with travelers to identify how this barrier impacts their use of multiple operators (either for one trip or for different trips over the course of a week/month) and how they perceived each option. Customers were asked to review each option under a range of scenarios and provide rankings and qualitative feedback on its value, fairness and legibility.

Option Comparison

The metric synthesizes this customer research to define:

- » The likely impacts that each option will have to traveler experience and traveler willingness to use multiple operators
- » Key customer identified pros and cons of each option

The following types of customer experience are explored:

- 1. Overlays** – passes (transit pass at various price levels) and caps (fare cap based on number of trips or at a certain price)
- 2. Transfer Discounts** – free or discounted transfers between local and/or regional transit
- 3. Regional Change** – common distance-based or zone-based fare system for regional transit
- 4. Regional and Local Change Zones on All Modes** – common distance-based or zone-based fare system for all Bay Area transit

Customer Impacts Summary

Table 4.1 provides an overview of each of the scenarios and their customer experience evaluation. This summary shows that Tier 2 – the unified fare by distance for regional services only performs most favorably across all evaluation metrics, while Tier 4 with small zones for all service is the least favorable.

Table 4.1 Customer Impacts Survey

Tier	Option	Value	Legibility	Fairness
1	Caps and Passes	Generally positive	Mixed feedback - some passes may be more complicated to understand than others	Generally positive
2	Unified Fare by Distance for Regional Services only	Generally positive	Generally positive - some concerns about learning multiple fares and figuring out which one is discounted	Generally positive
3	Unified Fare by Distance for Regional Services + Local Flat Fare	Generally positive	Mixed feedback - stated need for tolls to interpret structure (similar to BART today)	Generally positive
4	Small zones for all service	Mixed feedback, trending negative - concerns on how zones may raise fares for local services and for travelers who don't use multiple agencies	Mixed feedback - some recognition of improved understandability, however general concerns about the number of zones and ability to determine fare	Mixed feedback, trending negative - concerns on how zones will impact fares that are flat today or use fare by distance (BART)
4	Unified Fare by Distance for Regional Services + Local Flat Fare and Large zone +local flat fare	Generally positive	Generally positive	Mixed feedback - some concerns about fare increases

Strategic Case Summary

Table 4.2 illustrates how each option performs to meet daily ridership growth, equity impacts, and customer experience goals, as described in this chapter.

Table 4.2 Strategic Case Summary

Tier	Option	High Investment	Low Investment	Equity Impacts	Customer Experience
1	Individual Pass (“Puget Pass” model)	-	25,00	Requires mitigation -	
2	No-cost transfers (local/local, local/regional)	-	11,500	Investment is balanced across income levels, with least low income travellers paying more	
2	No-cost transfers (local/local, local/regional, regional/regional)	-	27, 610	Investment is balanced across income levels, with least 10% of low income travellers paying more and 20% paying less	
3	Unified Fare by Distance for Regional Services only	68,800	30, 200	Investment is balanced across income levels, with least 10% of low income travellers paying more and 25% paying less	*
4	Unified Fare by Distance for Regional Services + Local Flat Fare	62,500	16,100	Investment is balanced across income levels, with 20% of low income travellers paying more but 65% pay less	*
4	Small zones for all service	44,000	-2,100	Investment is balanced across income levels, with 25% of low income travellers paying more but 73% pay less	
4	Large zones + local flat fare	55,000	22,00	Investment is balanced across income levels, with 35% of low income travellers paying more but 65% pay less	*

Weaker Performance

Moderate Performance

Stronger Performance

- Not Applicable

* Some issues to resolve





5.

Economic Case

Economic Case Overview

The Economic Case evaluates each option based on the social value they can realize for local communities and the broader region. These benefits include:

- » Traveler benefits – including reduced travel time
- » Externalities – including reduction in pollution, congestion, and collisions and improved health

Combined, these metrics answer the questions:

- » What are the social benefits of Fare Integration over the next five years in discounted 2021 US dollars?
- » Is the level of social value of the option appropriate for the risk and change management required to deliver it?

Revenue impacts are not considered in this economic analysis. Economic analysis is focused on the benefits and costs to society as a whole. Changes in fare revenues or subsidy reflect changes in “who pays” for transit but not what the total cost of transit is. For example, under both the low and high investment scenarios, transit level of service and infrastructure remains constant. Increased subsidy is provided to match a decrease in fares and does not reflect increased societal resources (such as labor or materials) being applied to transit. In other words, only net changes in total resource costs should be captured in economic analysis.

Economic Analysis Approach

The economic case applies standard transportation economic analysis to monetize the benefits of fare integration on an annual basis. Daily model outputs from Travel Model 1.5 are annualized and monetized based on reduced negative impacts, such as fewer collisions, reduced emissions, reduced expenditure on automobile operations, and reduced congestion resulting from reduced vehicle miles travelled.

These annual benefits are then discounted using a social discount rate that reflects how future benefits are generally perceived to be of lesser value than benefits today. All analysis uses a five-year period starting in 2025 and ending in 2029.

Costs are typically included in economic analysis. At this point costs and cost impacts are under development. Costs reflect the amount of resources (such as equipment or labor) used to operate the transportation system. Subsequent analysis should integrate net new costs, such as new infrastructure or changes in operating costs.

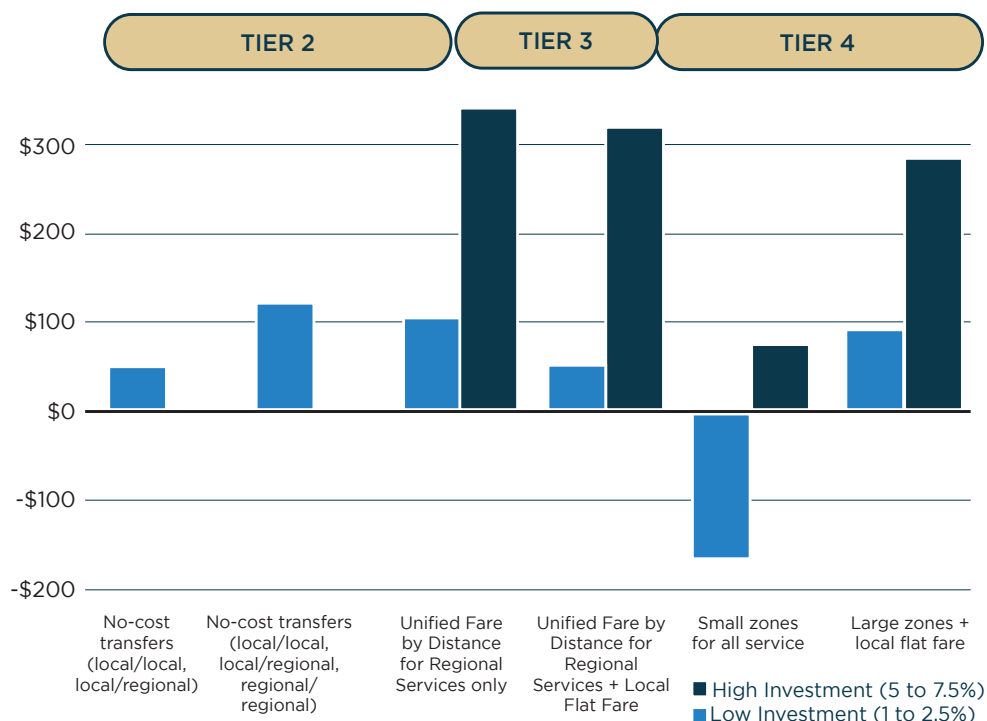
Economic Evaluation

Fare integration can generate a welfare benefit of \$50 million to \$120 million with low investment and by \$70 million to \$340 million with high investment over its first five years.

Economic Evaluation Summary

This evaluation notes the following conclusions for decision maker review:

- » **Low Investment:** Tier 2 has the highest benefits over the first five years of integration – this is because it does not raise the price for any traveller while Tier 3 and Tier 4 options may require some increase at this level of subsidy. Price increases may cause some travellers to choose automobile, which results in some increases in VMT. Tier 2 does not increase any fares which results in higher VMT reduction. Tier 4 small zones is noted to have a net loss in regional welfare by -\$170million over the first 5 years due to an increase in VMT.
- » **High Investment:** Tier 3 generates the most significant value to the region (\$340 m). Tier 4 offers lower benefits due to price changes to local agencies which results in some lost ridership, as well as generally higher fares for longer distance regional trips.







6.

Financial Case

Summary of the Financial Case

The Financial Case reviews the financial impacts and risks and identifies potential funding strategies. It evaluates each integration option based on three metrics: the required subsidy, the cost per new rider, as well as its cost effectiveness compared to other transit investments.

Combined, these metrics answer the questions:

- » What level of financial commitment is required to delivery integration?
- » How cost effective is each option?
- » How does the subsidy required for integration compare to other options?

Costs in the Financial Case

The study team is reviewing the costs of fare integration. These costs include:

- changes to operating costs for clipper (due to fare rule changes) and agencies
- capital costs for new software and equipment
- changes in maintenance and renewal costs for equipment

These costs require additional detailed analysis that will be conducted as the study advances.

Financial Evaluation

Required Subsidy

Fare policy changes can either increase or decrease revenue generated. The six policy options evaluated decreased fare revenue. Without fare increases, fare integration will would require additional investment or “subsidy” to offset these costs to various transit agencies.

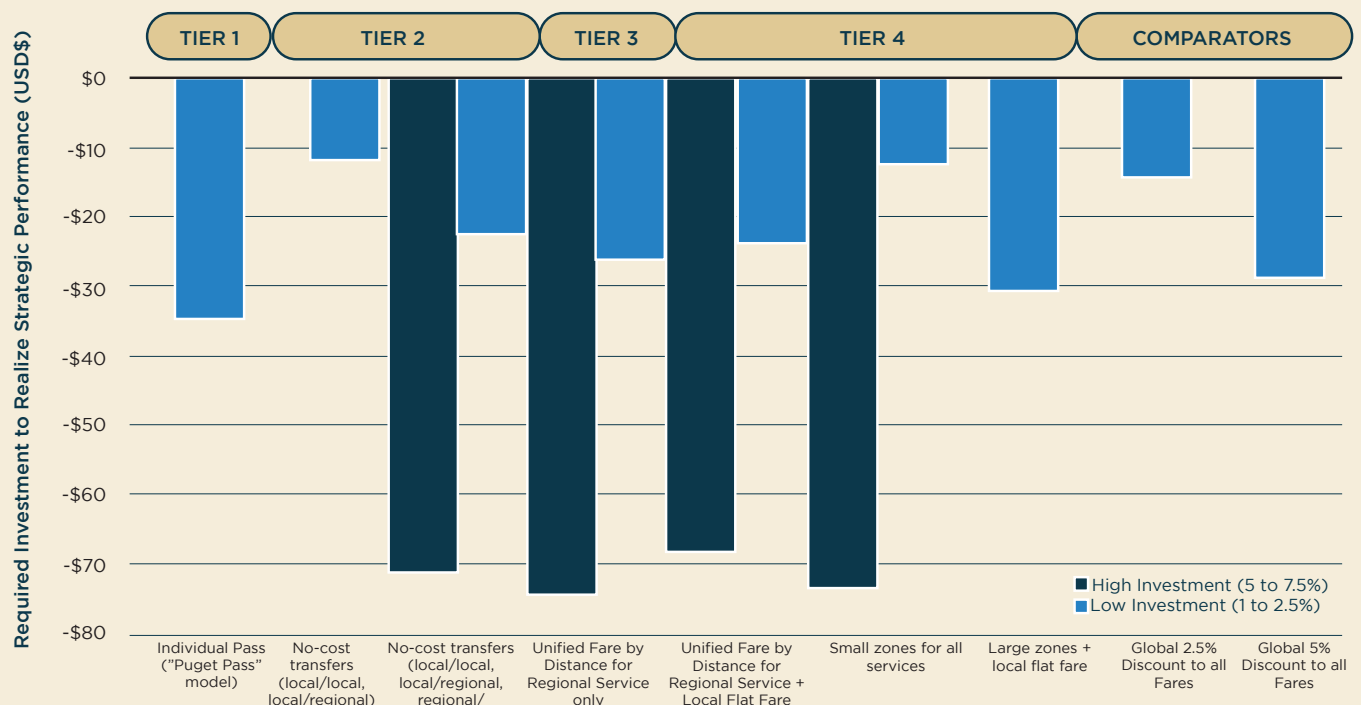
Options under Tier 2-4 were modeled based on the following “subsidy” scenarios:

- » Low investment (1 to 2.5% loss of pre-COVID revenue)
- » High investment (5 to 7.5% loss of pre-COVID revenue)

In addition, two global discount scenarios were modelled as comparators. These scenarios included:

- » 2.5% general reduction in all transit fares
- » 5.0% general reduction in all transit fares

Figure 6.1 Required Subsidy



The global discount scenarios help illustrate the relative benefits and cost efficiency of applying subsidy to fare integration in comparison to lowering fares generally across the region.

- » Subsidy required for Tier 1 Individual pass is slightly more than other low investment options as well as global comparators at about \$35 million per year. If applied in combination with other Tiers, this would require additional subsidy.
- » The cost of Tier 2 transfer discounts between all services ranges between \$11-\$25 million per year.
- » Lower investment variants of Tiers 3 and 4 will have some fare increases to offset these losses, while high investment variants of fare by distance with flat local fares, zonal, and zonal with flat local fare options also have fare increases. This is because Tier 2 level subsidy only covers free transfers and does not cover changes to regional-regional trips or local fares that are stipulated in higher tiers.
- » Broader standardization of regional fares requires either significant new subsidy or raising fares for many customers to offset lost revenue.

Cost per New Rider

Comparing cost per new rider among various options demonstrates the cost efficiency of each option. As shown

in the Strategic Evaluation, for example, Tier 4 options have the potential to significantly increase ridership in high subsidy scenarios. However, as shown in Figure 2.6, the relative value for money is much lower.

- » Tier 2 has the lowest cost per new rider, while Tier 3 has a similar cost per new rider at low levels of investment.
- » Widespread changes proposed under Tier 4 are more expensive as they lose ridership in some markets and generate growth in others – as level of subsidy applied to small zones decreases, the cost per rider increases as there are more ridership losses in key regional markets.
- » Comparator tests illustrate that at a regional scale, direct discounts to the existing structure are likely to have a greater value for money than Tier 4 as they do not raise or lower fares in a structured – but arbitrary – manner.

Relationship between Ridership and Subsidy for Each Option

Across each of the four tiers, ridership gains increase with level of investment and cost per new rider, suggesting that there is a diminishing return on investment but higher overall gains to be realized with more subsidy.

Figure 6.2 Cost per New Rider

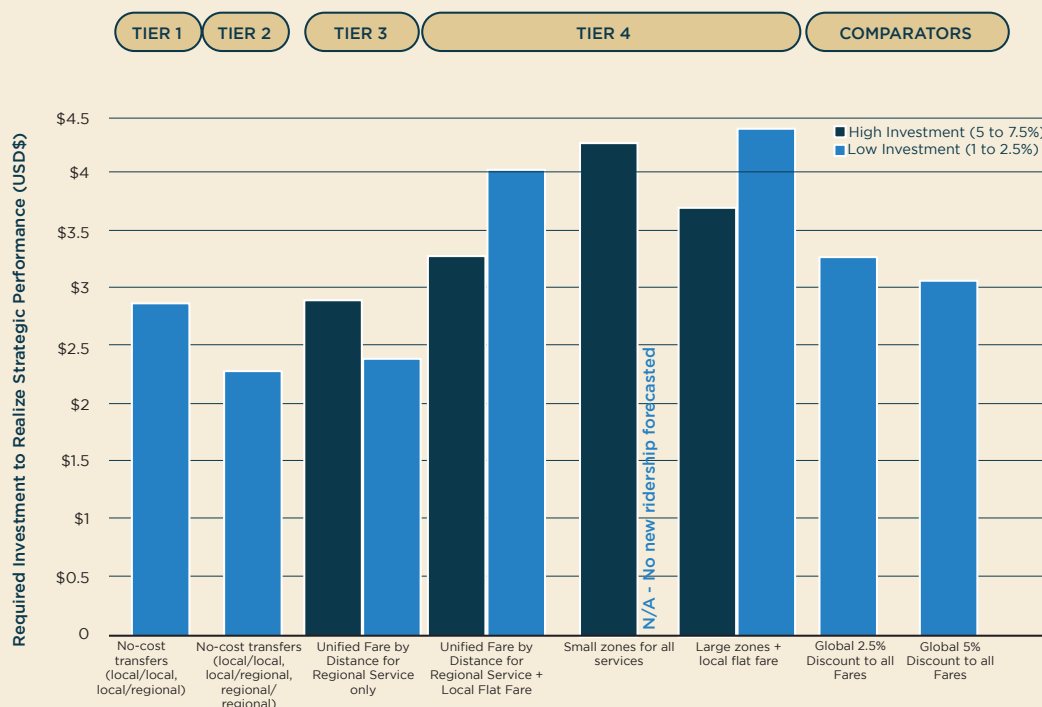


Figure 6.3 Relationship between Ridership and Subsidy

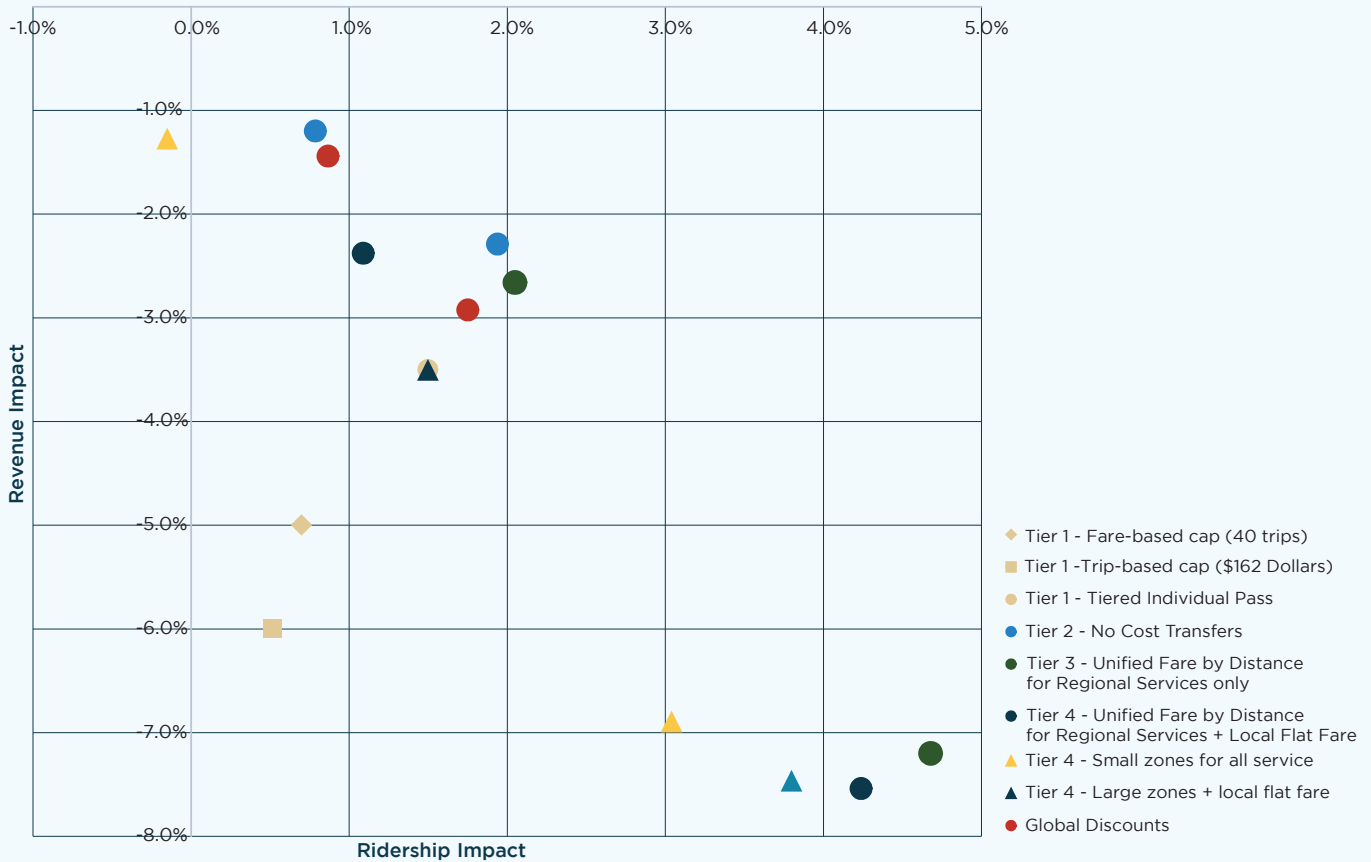


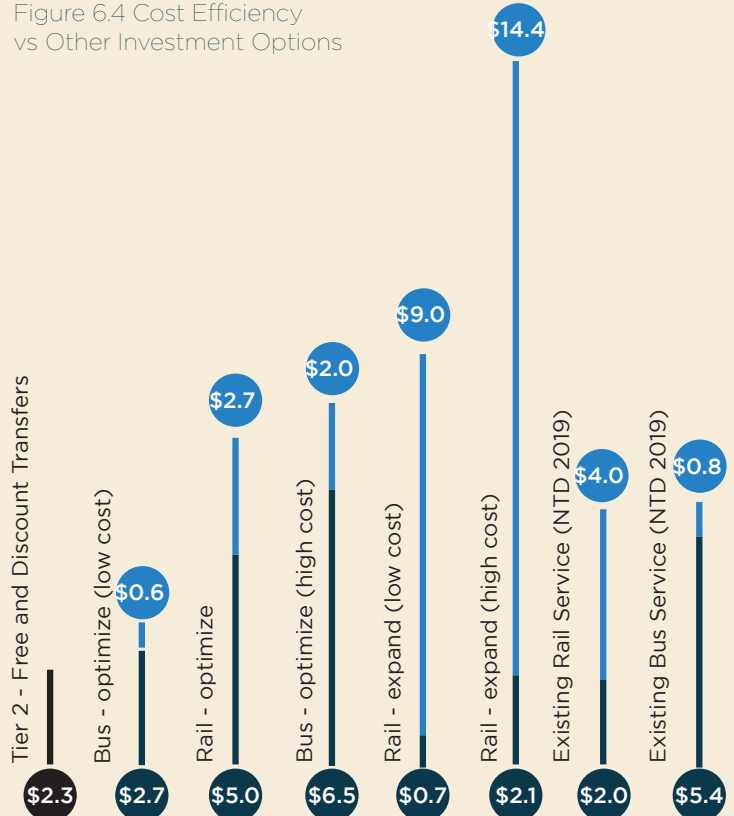
Figure 6.3 shows the relationship between ridership and revenue impact by mapping each of the options at similar levels of revenue impact (percent of revenue lost) and relative ridership increases.

- » At low levels of investment (roughly 1-2% subsidy), Tier 2 and 3 options perform best. Tier 4 (small zones) loses ridership.
- » At high levels of investment (roughly 5-7% subsidy), all Tiers show ridership increases more than 3%. Tier 3 has the highest ridership gains and exceeds Tier 4 options including zones and fare by distance options.

Cost Efficiency vs. Other Investment Options

Investment in fare integration performs favorably when compared with other investments in transit service and capital expansions. For example, the required subsidy for Tier 2 – Inter-Agency Transfer Discounts – has an estimated cost of \$2.25 per new trip, which is less than the estimated cost-per-trip of most proposed and active Bay Area transit projects (as modeled in Plan Bay Area 2050 using RTM 1.5.) The revenue impact is also less than the average cost-per-trip of the existing Bay Area transit system as of 2019.

Figure 6.4 Cost Efficiency vs Other Investment Options





7.

Delivery and Operations Case

Summary of the Delivery and Operation Business Case

The implementation case is assessed based on the key changes required across the following dimensions:

- » **Management** – how issues, risks, challenges, and changes will be managed over time
- » **Technology** – how it is implemented and procured
- » **Operations and Infrastructure** – how it will “run” on a day-to-day basis and what infrastructure is required
- » **Customers** – what level of change management will be required for customers

Delivery and Operation Evaluation

Tier 1

Tier 1 is anticipated to have low impact on management, as it can be delivered with agency-to-agency agreements or delivered and managed centrally across the region. There will likely be more a more complex revenue allocation approach required if agency to agency agreements are used to manage this tier. It can be delivered with existing technology or with Clipper 2.0. It will require minimal changes to agency infrastructure and operations, as it can be rolled out with operator training and some investment in marketing and communications, either through the agency or centrally. It will also have low impact on customer and change management – if a pass, it will be opt-in and will require marketing and advertising, while a cap option should be broadly advertised but will automatically apply to customers and will not require additional action to access.

Tier 2

Tier 2 will have either a low impact or medium impact on management, depending on the change required. It can either be delivered with agency-to-agency agreements or be managed centrally across the region, which will require a formula for revenue allocation. Tier 2 can be delivered with existing technology on a limited basis or completely with Clipper 2.0 on the initial rollout. It will require minimal changes to agency infrastructure and operations, as it can be rolled out with operator training (to message the discounts) and supporting advertising material. Tier 2 will have a low impact on customers and change management, as the new changes would only have to be explained and will require little action on the part of the customer.

Tier 3

Tier 3 will have either a low impact or medium impact on management, depending on the change. It could either be partially delivered with agency-to-agency agreements, or delivered centrally across the region, which will require one agency to set fares and develop a formula for revenue allocation. It will require Clipper 2.0 as well as new fare setting approaches for one or more agencies. There will be a medium impact to agency infrastructure and operations, as Tier 3 requires new fare collection infrastructure, marketing materials, and staff training for all agencies that are integrated, either on an agency-by-agency basis or centrally. There will also be a medium impact to customers and change management, as the end fare structure will be fare by distance or zones across all regional operators.

Tier 4

Tier 4 will have the highest impact on management, as it requires an overhaul of revenue allocation and/or subsidy/funding allocation. The fare setting authority would need to be a central manager to ensure sustainable change and consistency. Tier 4 will require Clipper 2.0, new fare setting approaches for all agencies, as well as “tap off” or “check out” function on buses in region-wide zones. It will have a high impact on agency infrastructure and operations, as it requires a centralized approach to new fare collection infrastructure, marketing materials, and staff training for all agencies across the region. The “tap off” function on buses could have operational impacts over the short to medium term, and operators will require additional funding to cover shortfalls in fare revenue while maintaining level of service. It will also have a high impact on customers and change management, as customers will have to learn fare by distance/zones for regional trips or flat fare/zone structure for local trips, which are more complex and have wide-ranging chips for that used to be under an operator flat fare.

Tier	Options	Management	Technology	Agency Infrastructure and Operations	Customer Change Management
1	Individual Pass (“Puget Pass” model)	Low	Low	Low	Low
2	No-cost transfers (local/local, local/regional)	Low/Medium	Low	Low	Low
	No-cost transfers (local/local, local/regional, regional-regional)				
3	Unified Fare by Distance for Regional Services only	Low/Medium	Medium	Medium	Low/Medium
4	Unified Fare by Distance for Regional Services + Local Flat Fare	High	Medium	High	Medium
	Small zones for all service				
	Large zones + local flat fare				





8.

Conclusion

The Conclusion provides a summary of the four evaluation cases and puts forward three recommendations for fare integration programs.

Business Case Summary

 STRATEGIC CASE	 ECONOMIC CASE
<p><i>Key conclusion - fare integration can generate significant ridership gains and VMT reductions while improving customer experience. Further analysis and policy development is required to manage the equity benefits and impacts of fare changes.</i></p> <p>Under low investment scenarios, Tiers 1-3 generate the highest ridership and VMT reductions. Tier 1 (1.1 – Individual Pass) can generate up to 25,500 new daily trips, while Tier 2 can generate over 27,000 daily trips (option 2.2). Tier 3 has the highest ridership gains with over 30,000 trips daily trips (option 3.1). Tier 4 has mixed performance – option 4.1 and 4.3 generate 16,000 and 22,000 trips per day, while option 4.2 is forecast to lose 2,000 trips.</p> <p>Under high investment scenarios, Tier 3 has the strongest performance with nearly 69,000 new daily trips (option 3.1). Tier 4 has a range of performance with 4.1 generating 62,500 daily trips, and 4.2 and 4.1 generating 44,000 and 55,000 trips respectively.</p> <p>Customer research indicated a generally positive view of Tier 2 and 3, with some feedback and issues to resolve on Tier 4 options.</p> <p>Bottom line – Tiers 2 and 3 are anticipated to generate similar ridership under low investment; however, if additional funding is available Tier 3 has the strongest strategic performance.</p>	<p><i>Key conclusion – fare integration can generate socio-economic value for the region over five years when delivered with low (\$50-\$110m) and high investment (\$280 to \$340).</i></p> <p>Under a low investment scenario, Tier 2 has the highest economic value at \$120m over five years, while Tier 3 has nearly comparable performance at \$110m over five years. Tier 4 performance is mixed – option 4.1 can generate \$50m and option 4.3 can generate \$90m, while option 4.2 is anticipated to generate -\$170m (a net disbenefit).</p> <p>Under a high investment scenario, Tier 3 has the strongest economic performance with up to \$340m generated for the region over five years. Tier 4 can generate \$310m (option 4.1), \$70m (option 4.2), or \$280m (option 4.3).</p> <p>Bottom line – Tiers 2 and 3 are anticipated to generate similar impact under a low investment scenario; under high investment Tier 3 has the highest economic value of all policies considered</p>

FINANCIAL CASE



Key conclusion - fare integration can generate ridership at a lower cost per new rider than other regional investments.

Under the low investment scenarios, Tiers 2-3 have the lowest cost per new rider, ranging from \$2.24 (Option 2.1) to \$2.39 (Option 3.1). Options in Tier 4 have a higher cost per new rider ranging from \$3.28 to \$3.69, with option 4.2 having a net loss in ridership.

Under the high investment scenarios, the cost per new rider for all options increases, reflecting declining financial efficiency. However, the cost per new rider is generally lower than other non-fare integration investments. Tiers 3 has a lower cost per new rider (\$2.84 for Option 3.1) than Tier 4 (\$4.02-\$4.34).

Bottom line - tiers 2 and 3 are anticipated to have the lowest cost per new rider and therefore strongest financial efficiency and value for money. Financial efficiency declines under a high investment scenario for all scenarios, however value for money is still competitive with other regional transit investments.

DELIVERY AND OPERATIONS DIMENSION



Key conclusion - all tiers and options were assessed based on risks and requirements across management, technology, operations and infrastructure, and customer impacts. This noted that while all tiers are deliverable, Tiers 1-2 have the lowest requirements and Tier 4 has the highest.

Tier 1-2 have low risks and impacts across management, technology, infrastructure and operations, and customer impacts.

Tier 3 has low/medium impacts on management and customers, with medium impacts to technology and agency infrastructure and operations. Increased impacts come from integrating regional fares.

Tier 4 has high impacts and risks in the management and infrastructure and operations categories, and medium/high impacts and risks on technology and customers. These risks and requirements are due to the significant changes to local fares called for in this tier.

Bottom line - tiers 1-2 are likely to be less onerous and risky to deliver for the region, while Tier 3 may carry some increased risks or impacts compared to these tiers. Generally, tier 4 is considered the most complex and highest risk to deliver.

Overall Considerations for Fare Policy Development

- » Tier 1 can be layered on other tiers and offers strong performance across all dimensions
- » Tier 2 has strong performance across all dimensions but has a 'benefit cap'
- » Tier 3 offers expanded benefits compared to Tier 2 at higher-levels of investment and comparable benefits at low investment. However, it is more complex to deliver.
- » Tier 4 tends to have lower benefits than Tier 3 at high investment and both Tiers 2-3 at low investment. It is also the most complex to deliver due to extensive changes to local fares.

Key Lessons Learned

- » In the short term, Tier 2 can be delivered with low investment to unlock a significant portion of the overall potential benefits of fare integration with minimal risk and negative impact to mitigate.
- » In the longer term, Tier 3 could be delivered to realize expanded benefits of fare integration. Tier 3 may be a strong later phase for Bay Area fare integration because it requires more significant change and potentially higher levels of investment to deliver upon its full potential compared to Tier 2.

Recommendations

1) Advance Tier 1 Pilot project to explore effects of integration in a post-COVID environment

This recommendation can be implemented through an employer or institutional pass, and/or as an individual pass. Both options provide an opportunity to demonstrate ridership gains and user experience benefits in an environment of uncertainty.

Employer/Institutional Pass

An employer or institutional pass would be applicable to all agencies where institutions or employers buy all-you-can-ride passes for all constituents. This kind of pass program has been successfully modeled in the Bay Area (Caltrain's Go Pass) and in similar regions and could be piloted using the existing Clipper system.

Pricing would be based on business location for a long-term program but can be simplified or subsidized for a pilot. Importantly, the pass would require careful design and mitigation to achieve equity balance for low-income riders and would be priced to achieve subsidy parity with other fares.

This program would engage Bay Area institutions and the business community in the transit system's success and promote commuter market recovery. Implementing this recommendation as a pilot project would allow for an evaluation of a barrier-free all agency transit pass to build toward broader fare integration in 2023.

Individual Pass ("Puget Pass" model)

An individual pass would include multiple agencies, allowing multi-agency users the same high-volume discounts now available to single-agency riders. This pass is comparable to the multi-agency pass offered in the Seattle ("Puget Pass") and Washington D.C. regions, which reduce user friction for multi-agency trips. This option can be implemented in Clipper 2 but would require system changes, namely a multi-agency revenue sharing structure.

Pricing for this pass would be based on user-selected fare (the most common trip value) multiplied by a standard factor. For example, a \$3.00 pass costs \$3 x 18 round trips per month (\$108). All trips up to \$3 are covered (a \$4 trip would require \$1 payment from e-cash). Under this model each new trip would have a \$4.25 cost in subsidy, with ridership expected to increase by 1.5% generating \$34M in revenue each year.

This multi-tiered structure aims to minimize revenue loss and improve equity performance (ensuring highest-volume rail/ferry riders are not over-subsidized relative to local bus riders). However, an up-front payment may exclude low-income riders. Pairing pricing for the pass with Clipper START fare capping would help mitigate these impacts.

2) Implement no-cost and reduced cost transfers beginning in 2023, coinciding with C2 rollout

This recommendation includes free or reduced cost transfer region-wide and is compatible with an all-agency institutional or employer pass program. A no cost or reduced cost transfer can be implemented for various types of local and regional trips. For local-local or local-regional connections, customers would only pay for the most expensive segment. For regional-regional connections, a transfer discount about equal to the minimum fare or the local bus fare would be applied. This option is readily implementable in the next generation Clipper within existing governance structures. With a \$2.25 subsidy per trip, modeling shows a 1.9% increase in ridership generating \$22.5M per year in revenue.

User research showed that reduced or no cost transfers were widely understood and valued by transit customers as they eliminate price barriers between agencies. They also create a more seamless transfer experience by treating inter-agency connections like single-agency connections and allowing regional service to function as a better part of the local network. Overall, discounts delivered clear ridership benefits, which are balanced across income levels.

3) Adopt a long-term plan to reach a Tier 3 level of integration, which aligns regional services under one fare structure

This recommendation involves a shared fare-by-distance structure for all regional services (rail, ferry, and regional express bus). Under a high investment option of \$2.84 per new trip, ridership would increase 4.7% with a revenue impact of \$70M per year. Under a low investment option of \$2.39 per new trip, ridership would increase by 2.1% and generate \$26M in revenue each year.

Implementing this structure would require new agreements or governance structures for regional service, some new Clipper equipment, and change management for some regional customers.

The benefits of this structure are balanced across all income levels, and it is a more legible system for regional travelers, infrequent users, and visitors. With this structure there is potential to be part of a broader customer-facing strategy for long-term regional recovery.

Further assessment of the benefits and costs of a single distance-based fare structure should be undertaken for regional services. Additionally, continued study of this option will help evaluate its impacts on post-COVID ridership, its role in the region, and a funding strategy for regional services.

