San Francisco
County Transportation
Authority

1455 Market Street, 22ND Floor, San Francisco, California 94103 415-522-4800 info@sfcta.org www.sfcta.org

Draft SFTP 2050 Appendix Items

[this page intentionally left blank]

SFTP 2050: APPENDIX A

SFTP 2050 Investment Plan Development Process

Introduction

The San Francisco Transportation Plan (SFTP) is an investment plan that details how available transportation funds[1] will be spent between now and 2050. This document describes how the SFTP was created based on previous long-range planning work and local and regional priorities. The SFTP includes two funding scenarios: 1) the Investment Plan scenario, which matches expected and available revenues to future investments, and 2) the Vision Plan, which demonstrates how potential new revenues could be used to further fund outstanding transportation needs.

The SFTP used the previous phases of ConnectSF, the City's long-range planning effort, as inputs into the plan's development; inputs included ConnectSF community engagement, vision, goals, the Transit Strategy, and the Streets and Freeways Strategy. In addition, the SFTP built upon ongoing community engagement, known goals and priorities including San Francisco's Climate Action Plan, Transit First Policy, community-based plans, and regional transit operating plans to develop the investment plan scenario and vision plan scenario for the SFTP.

To understand the transportation needs through 2050, a multi-agency call for projects and programs was conducted in late 2020 to inform the SFTP update and the 2022 Transportation Expenditure Plan for the existing half-cent transportation sales tax. The process allowed all transportation agencies that serve San Francisco to submit transportation capital and operating funding needs through the year 2050. The needs were grouped into categories that are consistent with the categories for the 2022 Transportation Expenditure Plan which, if passed by voters in November 2022, will help implement the SFTP.

To create the SFTP 2050 Investment Strategy, Transportation Authority staff created a revenue forecast drawing upon projections of federal, state, regional, and local funds prepared by MTC for the 2021 Plan Bay Area update (PBA 2050). Revenue projections for the SFTP 2050 cover Fiscal Years 2020-21 through 2049-50. The SFTP also considers potential new revenue sources for transportation in San Francisco, which would require voter approval or other legislative actions. These vision revenue projections are based on Transportation Authority forecasts and the SFMTA's T2050 program. These revenues fund the SFTP 2050 Investment Vision.

This document provides an overview of the SFTP Investment and Vision Plan scenario development process, documenting key inputs used to guide priorities for the investment and vision funding levels for each category – major transit projects, transit maintenance and enhancements, paratransit, streets and freeways, transportation system development and management, transit operations, and existing obligations.

1 More information on revenue sources available in Appendix B: Revenue Assumptions Table

Background: ConnectSF

The SFTP is a product of ConnectSF, San Francisco's multi-agency long-range planning process.

CONNECTSF: VISION AND STATEMENT OF NEEDS

ConnectSF Overview

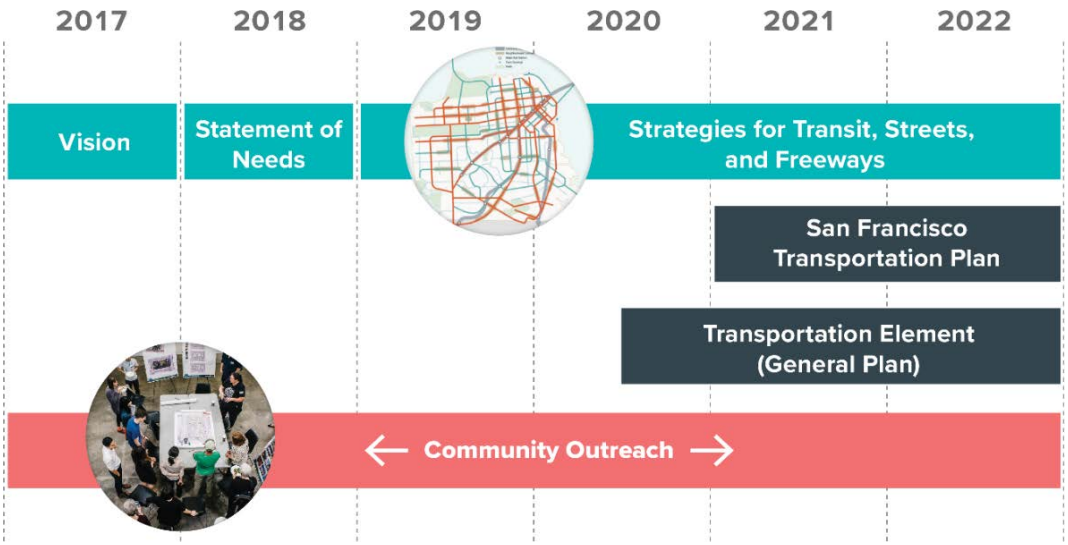
Initiated in 2016, ConnectSF is a multi-agency collaborative process to build an effective, equitable, and sustainable transportation system for San Francisco's future. The ConnectSF program was motivated by a recognition that significant transportation investments will be needed to support the city's growth over the next several decades. ConnectSF is a partnership between the Municipal Transportation Agency (SFMTA), Planning Department (SF Planning), Office of Economic and Workforce Development (OEWD), and Transportation Authority (SFCTA) to support a shared understanding of how to approach long range transportation planning in the city.

Phase 1 of ConnectSF produced a 50-year Vision for what people want to see San Francisco look and feel like, generated by discussions with the public and the ConnectSF Futures Task Force, comprised of individuals representing different perspectives of San Francisco. The Task Force was convened to engage in the development of scenarios and discussions of trade-offs for possible futures for the city.

Phase 2 of ConnectSF, which began in 2018, set out to answer what San Francisco needs to do to achieve the Vision, accounting for projected land use and travel patterns through 2050. The Statement of Needs showed that new investments and policies would be needed to meet the ConnectSF goals and was followed by two modal studies that were completed in early 2022: the Transit Corridors Study (TCS) and the Streets and Freeways Study (SFS) – both of these studies are discussed in more detail in the following sections.

The outcomes of these studies are the Transit Strategy and the Streets and Freeways Strategy. These two strategies are foundational elements in developing the SFTP 2050 and updating the Transportation Element of the San Francisco General Plan. As an element of ConnectSF, the SFTP aims to move San Francisco closer to the ConnectSF Vision and Goals by incorporating the Transit Strategy and Streets and Freeways Strategy core recommendations. Figure 1 presents a schematic timeline of all the elements of ConnectSF in the context of the SFTP development.

Figure 1: Components of ConnectSF



ConnectSF Vision and Goals

The ConnectSF process included a robust community engagement process to shape the ConnectSF Vision[1] and Goals. ConnectSF established a Vision for the city's future where:

- San Francisco is a growing, diverse, equitable city.
- There is a multitude of transportation options that are available and affordable to all.
- There is faster project delivery resulting from strong civic and government engagement.

The ConnectSF team also developed five specific goals for the future of land use and transportation in San Francisco:[2]

- **Equity.** San Francisco is an inclusive, diverse, and equitable city that offers high-quality, affordable access to desired goods, services, activities, and destinations.
- **Economic Vitality.** To support a thriving economy, people and businesses easily access key destinations for jobs and commerce in established and growing neighborhoods both within San Francisco and the region.

1 ConnectSF Vision Report, March 2018. https://connectsf.org/about/components/vision/

2 The ConnectSF Goals are described on page 7 of the ConnectSF Vision Report.

- **Environmental Sustainability.** The transportation and land use system support a healthy, resilient environment and sustainable choices for future generations.
- **Safety and Livability.** People have attractive and safe travel options that improve public health, support livable neighborhoods, and address the needs of all users.
- **Accountability and Engagement.** San Francisco agencies, the broader community, and elected officials work together to understand the City's transportation needs and deliver projects, programs, and services in a clear, concise, and timely fashion.

The SFTP scenarios ensure that investment plans advance ConnectSF Vision and Goals.

ConnectSF Statement of Needs

Following the development of the Vision and Goals, and prior to the COVID-19 pandemic, the ConnectSF team completed the Statement of Needs.[1] The Statement of Needs identified challenges that need to be addressed to realize the ConnectSF Vision, including:

- Accommodate forecasted growth
- Create equitable transportation outcomes
  - » Improve job access via sustainable modes
  - » Improve transportation connections for outer neighborhoods
- Improve sustainability and efficiency
  - » Reduce emissions by shifting more trips to sustainable modes
  - » Further expand transit capacity
  - » Manage congestion

The ConnectSF team also identified a set of major transportation corridors that would be considered in the Transit Strategy and/or the Streets and Freeways Strategy, based on the future land use and transportation needs identified through the Statement of Needs. As shown in Figure 2, the recommendations from each study, which are discussed separately in the next two sections of this document, were used to develop the SFTP.

1 ConnectSF Statement of Needs Report, December 2019. http://connectsf.org/wp-content/uploads/ConnectSF_Statement-of-Needs-Report-Final.pdf

Figure 2: SFTP Development Process

Building on the public outreach conducted during the development of the Vision and Goals, the ConnectSF team conducted stakeholder and public outreach from late 2019 through early 2020, including public events in Equity Priority Communities, Nextdoor comment threads, and online surveys in English, Spanish, Chinese, and Tagalog. Presentations were also offered to community-based organizations. The goal of the outreach was to gather robust and diverse feedback on the findings from the Statement of Needs, such as how, where, and why people travel in San Francisco and the region today and in the future. This feedback informed the project concepts developed and analyzed in both the TCS and the SFS. The key themes that emerged from the outreach included:

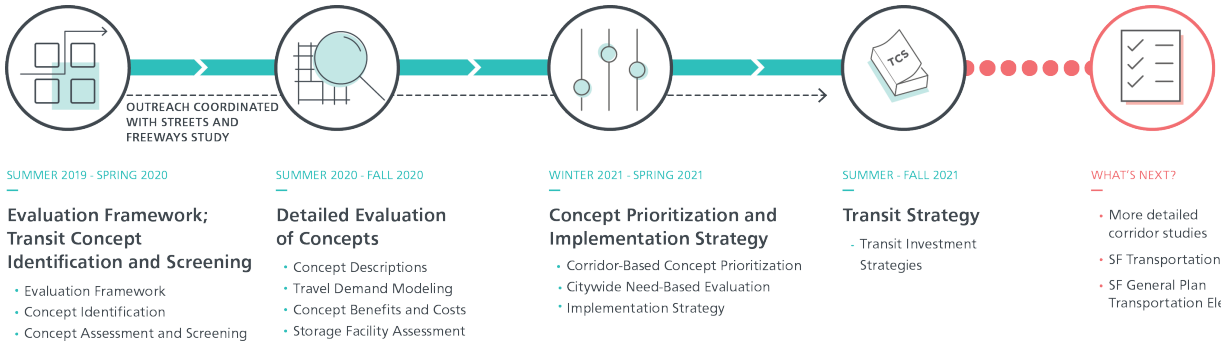
- It is relatively easy to access downtown and travel within neighborhoods via transit, biking, and/or walking.
- People find it more difficult to use transit when traveling between neighborhoods and to areas outside of downtown. The main reasons shared were that transit is often slow, unreliable, and/or infrequent and has poor connections and too many transfers. Specific geographic areas or corridors of interest for improving transit, walking, and biking connections included the North area of the city and Southwest-North/Northwest.
- Outreach participants said that convenience (proximity and frequency) was most important in deciding how they travel. Other factors cited were safety, reliability, accessibility, and affordability.
- Outreach participants want transit-related policies and investments that increase service, expand transit infrastructure, improve operations, and change fares. Improvements to active transportation were also popular.

CONNECTSF: TRANSIT CORRIDORS STUDY

Transit Corridors Study Overview

The Transit Corridors Study (TCS) developed and evaluated options for capital investments in San Francisco's public transit network through 2050. As depicted in Figure 3, the TCS included four major elements. The first three elements comprised the TCS technical evaluation, which led to the Transit Strategy, released in December 2021.[1]

Figure 3: TCS Elements and Timeline



TCS Goals and Priorities

The goals of the TCS were to prioritize local transit investments, identify regional transit priorities for the city, and articulate how these local and regional investments would support the ConnectSF vision and values. This included coordination with regional transit partners around relevant issues, including options for the planned Link21 second Transbay Crossing; the Downtown Rail Extension (DTX) and Pennsylvania Avenue Extension (PAX); and regional bus connections.

The TCS conducted a comparative analysis of representative transit concepts to understand the benefits that might be achieved through alternative major investments in each of the 13 ConnectSF transportation corridors.[2] The evaluation framework for this analysis was organized around 11 specific transit-focused objectives aligned with the ConnectSF Vision and Goals. Criteria and metrics were developed for each objective to capture how well each transit concept helped to achieve outcomes ranging from access and travel choices to cost-effectiveness and reliability. In addition to analyzing the transit concepts that had been proposed in formally defined ConnectSF corridors, the TCS also included consideration of citywide Muni bus and rail network reliability and efficiency improvements (similar to Muni Forward) that could be implemented in the shorter-term.

1 ConnectSF Transit Strategy, December 2021. https://connectsf.org/transit-strategy/

2 Concepts were intended to direct the commencement of corridor planning studies, rather than as formal project proposals; significant additional planning work and public engagement would be needed to define the details of any capital project advanced as a recommendation.

TCS Public Engagement

The ConnectSF team conducted public outreach in Spring 2021 to publicize and obtain input on proposed Transit Strategy initiatives. The outreach effort was modified due to COVID related restrictions on public meetings. Outreach included a Story Map (see https://arcg.is/1vz5G) – a web-based narrative format that illustrates content using text, maps, photos, and interactive elements – that summarized proposed investments being considered for the Transit Strategy. The Story Map was publicized through partnerships with community-based organizations (CBOs), an online town hall/webinar, and digital ads across multiple online platforms, and residents were encouraged to respond to the accompanying survey about their transit investment priorities. The following preferences expressed by people who responded to the survey are relevant to the SFTP:[1]

- **Cost-effective improvements to prioritize buses:** Over 40% of respondents ranked it as their first choice, and nearly 30% ranked it as their second choice.
- **Improvements to the light rail system:** Although only 20% of respondents ranked it as their first choice, over 50% ranked it as their second choice.
- **Major rail investments with a 10+ year horizon:** Nearly 40% of respondents ranked it as their first choice, and over 20% ranked it as their second choice.

Respondents cited "I want San Francisco to invest in major transit projects that will have the greatest impacts" and "I want to bring improvements to our transit system as fast as possible" as the primary reasons why they preferred more immediate improvements. The TCS also analyzed survey responses from specific demographic groups to better understand the preferences of populations who were underrepresented in the survey. This analysis supplemental available in the TCS Outreach Report.[2]

Study Outcomes – The Transit Strategy

The significant changes in San Francisco's transportation landscape during the pandemic highlighted the need to ensure that transit service works well for those who use it the most. The TCS evaluation demonstrated that, in most corridors, bus improvements can provide enough capacity and frequency to meet future travel demand, particularly if investments are focused on accelerating the renewal of existing capital assets and creating a focused high-frequency network. Modernizing the rail system to support key service improvements was the third citywide approach identified as a major investment priority. However, the analysis also showed that several corridors

1 Survey did not include a scientific sample

2 https://connectsf.org/wp-content/uploads/TCS_Outreach-Report_Final.pdf

will not be able to serve future community needs with bus-based projects alone; they require a major rail investment to build enough capacity to support future growth. The corresponding rail concepts for these corridors were selected as key priorities for major capital projects over the next few decades.

The overall recommendations that emerged from the TCS were synthesized into the ConnectSF Transit Strategy, which identifies both the long-term transit capital investment priorities for the city along with lower-cost projects that can deliver benefits sooner. The Transit Strategy's recommendations are organized into the following four major elements, all of which shaped investment priorities for the SFTP:

- **Make the System Work Better.** This element focuses on rehabilitation and replacement to clear the SFMTA's capital backlog and make the transit system more reliable. This is a systemwide effort to accelerate capital renewals, while each of the other three elements of the Transit Strategy propose improvements that are relevant to different subsets of the local or regional concepts that were studied in the TCS. The element also includes strategic service restoration throughout the city. An equity analysis of the 2021 service changes showed that modest improvements in travel time led to triple-digit increases in job access from some neighborhoods, reinforcing the importance of transit service to the city's post-pandemic recovery.
- **Deliver a Five-Minute Network.** This element includes street improvements that would support a citywide network of frequent, reliable bus and rail routes running every five minutes to provide quick, convenient access to all parts of San Francisco, including commercial districts, jobs, and housing. Many of the transit priority, street safety, and accessibility improvements would be implemented through existing programs such as Muni Forward. The future network would include express routes and a network of high-occupancy vehicle (HOV) lanes that would increase the speed and reliability of both local and regional transit services. These improvements could reduce crowding on the system to less than 5% of all transit trips.
- **Renew and Modernize our Rail System.** This element focuses on comprehensive upgrades and potential network reconfiguration to optimize the rail network, alleviate delays in the subway, improve reliability systemwide, and address crowding. Investments would include a new Muni train control system and improvements to individual lines that would enable longer trains and consistent, predictable service. These changes would allow the existing rail system to carry up to 30% more people. The strategy also supports regional rail upgrade programs including the BART Transbay Corridor Core Capacity Program, Caltrain Modernization Program, and Caltrain 2040 Business Plan.

- **Build More Rail.** This element focuses on major capital projects in transportation corridors where additional capacity and connectivity are most needed, including the Geary/19th Avenue Subway, extension of the Central Subway to Fisherman's Wharf, and a new Caltrain station to restore regional rail access to the Bayview. These larger corridor investments will require multi-year planning efforts and include regional rail extensions that were already being planned concurrent with the TCS, such as the Downtown Rail Extension (DTX) and Pennsylvania Avenue Extension (PAX).

Figure 4 provides a high-level summary of four key elements of the Transit Strategy.

Figure 4: Summary of TCS Recommendations

CONNECTSF: STREETS AND FREEWAYS STUDY

Streets and Freeways Study Overview

The Streets and Freeways Study (SFS) is the first comprehensive planning effort for San Francisco's Streets and Freeway network. This foundational work built on San Francisco's Transit First and Vision Zero policies, Racial Equity framework, and Climate Action Plan. Multiple concepts were developed and analyzed as part of the SFS. Concepts do not identify specific projects but are intended to guide future planning efforts.

SFS Goals and Priorities

The SFS seeks to support the overall ConnectSF goals by identifying the investments that are needed to make sure that infrastructure is maintained, low-carbon modes are accessible, safe, and reliable to use, and goods can easily be moved and delivered across the city. The SFS identified three key challenges that would shape the development of strategies to achieve these outcomes:

- **Street space in San Francisco is limited.** Strategies need to move more people and goods through the street space we have today.
- **Past investments have frequently had unintended negative outcomes,** such as divided communities, poor air quality, and safety challenges. Strategies should address these issues as a first priority.
- **The world is in a climate crisis.** San Francisco needs to make transit, carpooling, walking, and biking more convenient for more people to achieve its goal of net zero emissions by 2040.

The SFS identified five strategies to address these challenges and advance the ConnectSF Vision and goals:

- **Maintain and reinvest** in the current transportation system
- **Prioritize transit and carpooling** on our streets and freeways
- **Build a complete network** for walking and biking
- **Prioritize safety** in all investments and through targeted programs
- **Repair harms and reconnect** communities

SFS Public Engagement

The ConnectSF team conducted public outreach in Summer 2021 to publicize and obtain input on proposed Streets and Freeways Strategy recommendations. The outreach effort featured an online survey that summarized proposed recommendations considered for the Streets and Freeways Strategy and asked participants to prioritize various tools to advance each recommendation. The survey was publicized through partnerships with community-based organizations (CBOs), an online town hall/webinar,

and digital ads across multiple online platforms. Survey respondents expressed the following preferences.[1]

Build a complete active network: About 70% of respondents ranked the three tools – reducing speed limits and creating more space on neighborhood streets; separated, high quality bike network; and walk and bike connections to transit – as important. There was a slight preference for improving walk and bike connections to transit.

Dedicate space for efficient travel options: The top three tools were ranked as important by about 50% of respondents; they are: rewards and discounts for using transit, traffic calming on local streets to minimize cut-through traffic, and manage curbs to reduce double parking.

Street safety: The top three tools were ranked as important by about 50% of respondents; they are: traffic calming, more dedicated space to walk and bike, and reduce speed limits. Advocating for authority to use speed safety cameras was ranked as important by 40% of respondents.

Major road transformations to major roads and freeways: Each of the three tools – reconnect communities that have experienced harms from the past investments, complete streets, and pairing freeway re-designs with land use plans and policies to support development and avoid displacement – were ranked as important by more than 70% of respondents. Complete streets was ranked important most frequently (50% of respondents).

Study Outcomes – The Streets and Freeways Strategy

The high-level concepts included in the Streets and Freeways Strategy are intended to guide future planning efforts, and would require additional planning, community engagement, and technical analysis. The concepts were organized based on four project types, all of which are reflected in the SFTP:

- **Maintenance and Resilience.** This element includes concepts to help prepare the city's transportation infrastructure for the risks of climate change.
- **Transit and HOV Priority.** This element prioritizes street space for transit and high-occupancy modes and improve traffic management.
- **Safety and Active Transportation Network.** This element includes concepts that expand the bike and walking network and improve street safety for the most vulnerable road users.

1 Survey did not include a scientific sample

- **Reconnect Communities.** This element includes medium-term and long-term concepts to redesign infrastructure, create more complete streets, and integrate transportation and land use planning.

Partner Plans

The SFTP 2050 aligns with partner agency plans. Since the last SFTP update in 2017, partner agencies have conducted two key studies outside of the ConnectSF work program that identify the need and priority for transportation projects in San Francisco. Figure 5 provides an overview of these plans and how they were used to inform the SFTP. The following sections discuss these plans, focusing on the goals and priorities, public engagement priorities (if applicable), and outcomes of each plan that informed the SFTP Investment and Vision Plan scenarios.

Figure 5: How Partner Plans Informed the SFTP

PARTNER PLAN	HOW IT INFORMED THE SFTP
Plan Bay Area 2050	Modeling, revenue forecasts, Equity Priority Communities
Climate Action Plan	Climate goals

The SFTP also aligns with and carries out San Francisco's Transit First Policy, adopted in 1973. The policy calls for prioritizing transit, walking and biking over private automobiles and outlines a set of Transit-First principles to guide decision-making. The principles support long-range transportation goals that are further advanced by the SFTP, such as mode shift, clean air, and equity.

PLAN BAY AREA 2050

Plan Bay Area Overview

Plan Bay Area (PBA) is the regional long-range plan that connects four key elements of Bay Area planning: housing, economy, transportation, and environment. The plan covers a 30-year horizon and provides a roadmap to meet projected household and employment growth in the nine-county San Francisco Bay Area. The regional governing bodies, Metropolitan Transportation Commission (MTC) and Associated Bay Area Governments (ABAG) work to carry out the planning process. The plan is a coordinated effort across agencies and stakeholders within the region to align goals and guide future planning and growth. Key inputs from PBA that shaped the SFTP investment priorities included future growth, revenue forecasts, and the Equity Priority Communities (EPC) framework.

PBA 2050[1] was adopted in October 2021. The $1.4 trillion plan provides 35 regional strategies to invest in an equitable and resilient Bay Area. PBA does not fund specific transportation projects, nor does it change local land use policy; it is the regional long-range plan that provides a guide for the region in identifying shared goals and potential strategies. PBA satisfies the federal government's requirement to develop a Long-Range Transportation Plan (LRTP) for urban areas with a population greater than 50,000. The plan also complies with California Senate Bill 375, which requires regions to complete a Sustainable Communities Strategy (SCS) as part of the RTP. The SCS is a plan that integrates transportation, land use, and housing to meet per-capita greenhouse gas reduction targets set by the California Air Resources Board (CARB).

Public input and community engagement shaped the PBA 2050 process. In total, over 450 public stakeholder events and activities were held with a total of 234,000 public comments. MTC and ABAG were intentional with their outreach – using the established Equity Framework to guide the engagement process. As a result, two-thirds of events and activities were targeted toward EPCs and other underserved populations. The input given during the engagement process led to the guiding principles which MTC and ABAG then used to identify potential projects and policies. Community input was then gathered to further expand and refine the identified strategies. The results led to a final set of 35 policies that integrate one or more guiding principles and address community concerns.

Study Outcomes

PBA 2050 identified 35 strategies to improve Bay Area quality of life, including 12 long-range transportation strategies. The transportation strategies fall under three larger themes, all of which strongly align with the ConnectSF recommendations (discussed in the following sections) and were foundational to the development of the SFTP. The themes were:

- **Maintain and optimize the existing transportation system** through maintenance and increased investment and policy action. These strategies include addressing pandemic-related cuts to transit service and funding, congestion relief, and community-led investments in EPCs.
- **Create healthy and safe streets** by encouraging a balanced, multi-modal network and reducing speed limits in appropriate areas, expanding the existing bike lane network, and promoting Vision Zero safety policy.

1 https://www.planbayarea.org/

- **Build a next-generation transit network** by prioritizing transit investments that meet the growing demand for travel throughout the region.

The transportation investments proposed by PBA 2050 are estimated to cost $578 billion.

CLIMATE ACTION PLAN

Climate Action Plan Overview

In December 2021, the City of San Francisco released the Climate Action Plan (CAP) calling for net-zero emissions by 2040.[1] The CAP builds on an established foundation of climate policy, as San Francisco has long been a leader in the region and the United States. The City's first CAP was published in 2004, and the city has since continued to prioritize environmental sustainability. Figure 6 presents and overview of San Francisco's climate policy milestones over the last two decades.

The CAP 2040 builds upon previous actions and research while using a data-driven approach to environmental planning. The plan was led by the San Francisco Department of Environment with collaborative efforts from other city departments including SFCTA, San Francisco Planning, SFMTA, the Office of Racial Equity, and the Public Utilities Commission. The recommendations put forth in the CAP shaped the climate goals of the SFTP and, as a result, the SFTP advances many of the CAP strategies.

Figure 6: San Francisco Climate Policy Milestones

YEAR	MILESTONE
2004	San Francisco's First Climate Action Plan
2013	San Francisco's updated Climate Action Plan
2015	0-50-100 Roots Climate Action Framework Launched
2016	Emissions Reduced by 30% Below 1990 Levels
2017	50% Low Carbon Trips Achieved — New Goals Set to 80%
2018	Mayor Breed Committs to Net-Zero Emissions by 2050
2019	San Francisco Board of Supervisors Declares a Climate Emergency
2019	100% Renewable Electricity Requirement for Large Commercial Buildings
2019	Emissions Reduced by 41% Below 1990 Levels (6 years ahead of schedule)
2020	Natural Gas Banned in New Construction
2021	Mayor Breed Advances Updates to Climate Action Goals in Chapter 9 of the Environment Code, Commits to Net-Zero Emissions by 2040, San Francisco Board of Supervisors Approves

Source: San Francisco Climate Action Plan, 2021.

1 https://sfenvironment.org/climateplan

CAP Goals and Priorities

The CAP prioritizes emission reduction to meet net-zero goals while also recognizing that Black, Indigenous, and People of Color, people with disabilities, and other underserved populations should be prioritized in the process. The plan makes the following four core commitments to advance climate justice: 1) build greater racial and social equity, 2) protect public health, 3) increase community resilience, and 4) foster a more just economy. The CAP identifies several Climate Action Goals to guide the process of identifying strategies and priorities, including specific **transportation** goals:

- By 2030, increase low-carbon trips to at least 80% of all trips and increase electric vehicles (EVs) to at least 25% of all private vehicles registered
- By 2040, increase EVs to 100% of all private vehicles registered

Additional Climate Action Goals included:

- **Buildings:** By 2021, require zero onsite fossil fuel emissions from all new buildings; By 2035, require zero onsite fossil fuel emissions from all large existing commercial buildings and all buildings by 2040
- **Clean Energy:** By 2025, supply 100% renewable electricity, and by 2040, supply 100% renewable energy
- **Zero Waste:** By 2030, reduce solid waste generation by at least 15% and reduce the amount of solid waste disposed of by incineration or landfill by at least 50% below 2015 levels
- **Housing:** Build at least 5,000 new housing units per year with maximum affordability, including no less than 30% affordable units, and with an emphasis on retaining and rehabilitating existing housing
- **Roots:** Sequester carbon through ecosystem restoration, including increased urban tree canopy, green infrastructure, and compost application
- **Housing:** Build at least 5,000 new housing units per year with maximum affordability, including not less than 30% affordable units, and with an emphasis on retaining and rehabilitating existing housing

The CAP goes beyond the reduction of emissions and includes actions that advance equity by addressing disparities by race, class, and other social determinants. Racial and Social Equity are one lens that the CAP uses to analyze and put forth solutions to the Bay Area's climate problems, recognizing that Bay Area BIPOC stand to be the most affected by climate pressures while simultaneously being the least responsible for causing climate change. Other lenses used are Economic Recovery and Just Transition,

Protecting Public Health, and Resilience. All 5 lenses were used to identify critical issues and shape proposed strategies for future implementation.

CAP Outcomes

The CAP identifies 31 strategies and 159 supporting actions for San Francisco to achieve its climate and equity goals across sectors. Many of the strategies are reflective of ConnectSF recommendations, and the SFTP further advances the goal of achieving zero emissions through these efforts. The CAP includes seven transportation and land use strategies:

- Build a fast and reliable transit system that will be everyone's preferred way to get around.
- Create a complete and connected active transportation network that shifts trips from automobiles to walking, biking, and other active transportation modes.
- Develop pricing and financing of mobility that reflects the carbon cost and efficiency of different modes and projects and correct for inequities of past investments and priorities.
- Manage parking resources more efficiently.
- Promote job growth, housing, and other development along transit corridors.
- Strengthen and reconnect communities by increasing density, diversity of land uses, and location efficiency.
- Where motor vehicle use or travel is necessary, accelerate the adoption of zero-emissions vehicles (ZEV's) and other electric mobility options.

According to San Francisco's GHG inventory on which the CAP is based, transportation accounts for 47% of the City's emissions. The transportation sector has seen a 19% decrease in emissions since 2019, when the CAP was first introduced.

Public Input on Investment Priorities

To inform the SFTP planning process, the SFCTA engaged with communities, with a focus on Equity Priority Communities (EPCs), to gather input on their priorities for transportation investments. The team used a combination of three outreach methods to connect with the community: an online, multilingual survey, community conversations, and a public Town Hall.

Key findings from outreach that informed SFTP investment priorities include the following:

- Transit investments were a clear priority for participants; many highlighted their preference to prioritize transit service expansion, increase reliability, and restore service to previous levels and previously existing lines.
- Equity and affordability were a key concern amongst participants, many of whom mentioned they would like to see improved affordability across all modes to reduce barriers for low-income residents.
- Although not the highest priority for funding, many participants mentioned that they would like to see investments in safety and active transportation projects.
- Perceived physical safety was a concern for many participants, noting that interventions such as pedestrian scale lighting and traffic enforcement would promote a greater sense of safety and encourage non-vehicular travel.
- Participants also mentioned that they would like to see new major rail projects and a more integrated transit system that connects to other transit systems across the region, such as BART and Caltrain.
- Transformative freeway projects, while presented as an option in the survey, were found to be the lowest priority for many participants and stakeholders despite there being previous interest in freeway removals and other projects that reduce vehicle capacity.
- The importance of project delivery and accountability was also mentioned by stakeholders; they would like a more transparent approach to communicating project impact, potential mitigation efforts, and return on investment.

Current Transit Conditions in San Francisco

Another key consideration for the SFTP is the capacity for transit revenues to maintain service. The SFTP considers the current condition of revenues needed to maintain transit service and capital investments in system maintenance.

For SFMTA, problems resulting from deferred capital investments disproportionately affect people who depend on transit, as recognized by a sizable majority of people who identified repairs and maintenance as high priorities in the SFMTA's 2021 customer

satisfaction survey.[1] A portion of the SFMTA's roughly $500 million annual capital budget goes toward maintaining or replacing capital infrastructure.[2] For example, over the past decade the City has invested in maintaining Muni's vehicle fleet to make buses and trains more reliable, including replacing outdated vehicles with new ones. Strengthening the City's transit system must continue with repairing and replacing heavily used infrastructure while addressing the multi-year backlog of maintenance work, such as replacing the Muni Metro train control system and rebuilding Muni's bus yards, which are too small to accommodate the current fleet and do not meet current seismic safety standards. The current capital renewal backlog (infrastructure assets that are past their useful life) is $3.8 billion, a figure that will continue to grow unless additional resources are directed towards strengthening the City's transit system.[3]

Even prior to the pandemic, the SFMTA had a growing budget deficit. Revenues from fares and parking that fund the City's transportation system did not cover ongoing expenses for transit service, infrastructure maintenance, and safety improvements for people walking and biking. These deficits were plugged by reserves and one-time sources. COVID-19 only exacerbated long-standing and growing structural deficits when it caused a steep drop in Muni revenue from parking and fares. Federal pandemic relief funds helped fill the gap but will run out in 2025. Moving forward, recovery in economic growth along with additional revenue sources will be needed to support continued restoration of Muni service levels and continued investments in making the City's transit system resilient, reliable, and financially sustainable in the long-term.

Regional rail operators (BART and Caltrain) also reduced service early in the Pandemic to match employee availability. Reduced service also reduced operational expenses as decreased demand lowered the agencies' fare revenues, though not nearly enough to offset the loss in revenue. For some agencies, reduced service reduced operational expenses, though the cost per-service-hour often increased with additional cleaning procedures and capacity restrictions to help fight the spread of COVID-19. As the region began to recover, service on some regional systems was restored close to pre-pandemic levels, despite reduced ridership. This has created more funding shortfalls because ridership on regional services has been slower to recover, while the systems have high fixed costs to operate.

1 https://www.sfmta.com/blog/muni-customer-satisfaction-survey

2 SFMTA Capital Improvement Program, Fiscal Year 2021-2025. See p. 5 (Capital Program Overview).

3 SFMTA Annual State of Good Repair Report, 2020. See p. 23 (Reported Asset Backlog).

Investment Priorities

Based on the outcomes of prior ConnectSF phases, recent partner plans, and SFTP outreach, the SFCTA identified the following priorities for the Investment Plan:

- Invest to maintain pavement, transit assets, and prepare for resilience by keeping roads, sidewalks, signs, signals and bikelanes in overall good condition and reducing the maintenance backlog for local and regional transit to improve transit reliability.
- Invest to improve transit reliability and efficiency, particularly on the busiest lines
- Invest in core capacity and rail modernization to allow for more frequent Muni and BART train service
- Invest in street safety improvements across the city
- Invest in the walking and bike network to close gaps in the network and improve connections to transit

The priorities will be further advanced by the Vision Plan. Based on the outcomes of recent partner plans and SFTP outreach, the SFCTA identified the following priorities for the Vision Plan:

- Increase funding levels for Muni to meet or exceed pre-pandemic levels
- Support transit reliability and metro modernization by focusing on state of good repair
- Invest in street safety for all travelers
- Advance the next generation of transportation projects to make new rail capacity and reconnect communities and repair past harms of past investments in our major roads and freeways

Concept Development Process

INVESTMENT PLAN

The majority (about 85%) of the of the revenues for the SFTP are committed, which means they are already dedicated to certain projects or have a narrow set of eligible uses. The discretionary revenues in the plan (about $13B in the Investment Plan scenario) have more flexibility for how they can be allocated. The priorities defined in the above section were used to guide how discretionary revenues were allocated. Considerations about the current transit system were also used in this decision-making process, specifically (1) that

the available revenues can only support SFMTA transit operations at 2022 service levels until 2025 and (2) that SFMTA has expressed a significant maintenance backlog that puts providing consistent and reliable long-term service at risk.

SCENARIOS

Within the discretionary revenue, there is about $3 billion that have enough flexibility to go towards transit operations or maintenance. Three alternatives were assessed (described below) to understand the tradeoffs of allocating the approximately $3 billion in revenues in different ways.

1. **Investing in all modes:** this alternative allocated revenue to maintain 2022 Muni service levels, reduce the funding gap for Muni state of good repair to about 42%, maintain the citywide goal for an overall street condition of PCI score 75[1], advance street safety projects, begin planning for next generation transportation projects, and programs to support a shift to more trips made by sustainable modes.
2. **Focus on Muni Operations:** this alternative fully put the revenues towards Muni operations and resulted in maintaining current (2022) service levels and an additional 5% increase in the operations budget. Because all this money was put towards operations in this scenario, the funding gap for Muni state of good repair increases to 45%, a PCI score of 75 cannot be met, and additional funding for street safety, planning for next generation transit projects, and mode shift programs cannot be allocated.
3. **Focus on Muni state of good repair:** this alternative fully put the revenues toward Muni state of good repair and resulted in a reduced funding gap for Muni state of good repair to 33%. In this alternative, 2022 Muni service levels are maintained, a PCI score of 75 cannot be met, and additional funding for street safety, planning for next generation transit projects, and mode shift programs cannot be allocated.

Based on public priorities voiced through outreach, the project team determined that scenario 1 was best suited for advancement, as it prioritizes transit as well as other community priorities and advances more of the 5 ConnectSF goals.

VISION PLAN

The Vision Plan assumes multiple potential new revenue sources, totaling about $15 billion. The majority of revenues ($8.5 billion) is assumed to come from San Francisco's share of a new regional measure and other local sources. These

1 PCI is a Pavement Condition Index, which considers the overall condition of all San Francisco streets.

revenues are allocated based on the priorities outlined in the previous section, with a specific goal to increase transit service investment levels beyond pre-pandemic conditions and further improve street safety.

SFMTA's T2050 plan makes up $6.7 billion of the vision revenues.[1] The SFTP allocates this portion of the vision revenue to reflect SFMTA's stated uses of this revenue – about half to transit operations, about half to transit maintenance, and a portion towards the Safe Routes to School program[2].

Investment and Vision Plans

Figure 7 below, includes the SFTP Investment and Vision Plan funding levels for identified projects and programs; all costs are shown in billions of dollars (2020). The needs are organized by overarching categories and subcategories, which align with the 2022 Transportation Expenditure Plan[3]. The Investment Level column describes the extent to which the SFTP Investment Plan funds San Francisco's need. For programs which receive additional funds in the Vision Plan, the additional benefit is described. The Resilience Co-Benefit column notes projects or programs that would include improvements to address the risks of climate change – sea level rise, earthquakes, or other natural risks.

About $2 billion of the new local/regional discretionary revenue in the Vision Plan is set aside as a placeholder for transit operations / transit capital investments. This allows flexibility for this future new revenue to be put towards transit operations to further increase service levels, toward transit capital maintenance and rehabilitation, and/or to capital projects to further expand bus or rail in San Francisco. The SFCTA will continue to work closely with local and the regional stakeholders to identify which new revenue sources to pursue and when and how to best allocate the resources.

1 https://www.sfmta.com/projects/transportation-2050

2 https://www.sfmta.com/sfmta-school-safety-programs

3 https://www.sfcta.org/ExpenditurePlan

Figure 7: SFTP 2050 Investment Plan and Vision Plan Funding Levels

PROGRAM	INVESTMENT LEVEL	NEED ($B, 2020)	INVESTMENT PLAN ($B, 2020)	VISION PLAN ($B, 2020)	RESILIENCE CO-BENEFIT
Major Transit Projects					
Muni Reliability and Efficiency Capital Improvements Transit reliability improvements (e.g Muni Forward, transit only lanes, transit signal priority, etc.)	**Investment:** Fully funds transit priority improvements on major transit lines	$1.09	$1.09	$1.09	
Muni Rail Core Capacity Includes train control, light rail vehicle feel expansion, 3-car trains in the Muni Metro Tunnel and on the N Judah, Muni Metro subway enhancements, and Muni Facility Expansion	**Investment:** Fully funds all needs, except for the expansion of new Muni Facilities	$0.82	$0.72	$0.72	X
BART Core Capacity San Francisco's share of costs for more BART train cars and system improvements to run more trains	**Investment:** Fully funds need for San Francisco's share	$3.54	$3.54	$3.54	
Caltrain Enhanced Service: Capital Capacity Improvements Increase Caltrain service from 6 to 8 trains per hour	**Investment:** Does not fund need	$1.21	$0	$0	
Caltrain Downtown Extension Extension for Caltrain and future High-Speed Rail from 4th and King to Salesforce Transit Center	**Investment:** Fully funds need	$5.00	$5.00	$5.00	
Pennsylvania Alignment (PAX) underground alignment for Caltrain and future High Speed Rail to 4th and King station	**Investment:** Funds design phase **Vision:** Additional investment to be used for leveraging to fully fund need	$2.50	$.04	*	X
Transit Maintenance & Enhancements					
Transit Maintenance, Rehabilitation and Replacement					
Muni Vehicles Maintenance, Rehabilitation and Replacement Maintains Muni vehicles for 30 years	**Investment:** Funds 70% of need **Vision:** Increases funding to reach approximately 85% of need	$7.06	$4.95	$5.95*	X
Muni Facilities Maintenance, Rehabilitation and Replacement Maintains Muni facilities for 30 years	**Investment:** Funds approximately 25% of need **Vision:** Increases funding to approximately 70% of need	$4.66	$1.09	$3.35*	X
Muni Guideways Maintenance, Rehabilitation and Replacement Maintains Muni guideways for 30 years	**Investment:** Funds approximately 85% of need **Vision:** Increases funding to approximately 90% of need	$2.55	$2.18	$2.31*	X
BART Maintenance, Rehabilitation and Replacement — San Francisco Share Maintains BART system for 30 years	**Investment:** Funds approximately 10% of need **Vision:** Increases funding to approximately 40% of need	$5.59	$0.61	$2.15	X
Caltrain Maintenance, Rehabilitation and Replacement — San Francisco Share Maintains Caltrain system for 30 years	**Investment:** Funds approximately 60% of need **Vision:** Increases funding to approximately 65% of need	$0.96	$0.55	$0.60	X
Ferry Maintenance, Rehabilitation and Replacement — San Francisco Share Maintains ferry system for 30 years	**Investment:** Funds approximately 40% of need and maintains landside assets	$0.04	$0.01	$0.01	X

PROGRAM	INVESTMENT LEVEL	NEED ($B, 2020)	INVESTMENT PLAN ($B, 2020)	VISION PLAN ($B, 2020)	RESILIENCE CO-BENEFIT
Transit Enhancements					
Southeast Waterfront Transportation Improvements — Capital Improvements Multimodal path and transit service provisions	**Investment:** Fully funds city transportation commitments for multimodal path and transit service; assumes developer fees.	$0.64	$0.64	$0.64	
F-Line Extension Extends Muni F-Line to Fishermans Warf	**Investment:** Fully funds F-line extension; assumes outside funding.	$0.10	$0.10	$0.10	
Additional Muni Motor Coaches Up to 110 new Muni buses	**Investment:** Funds approximately 65% of need	$0.23	$0.16	$0.16	
Other Transit Improvements Improvements to transit facilities (e.g. elevator upgrades, accessibility, etc.)	**Investment:** Funds approximately 23% of need	$0.61	$0.14	$0.14	
BART Station Access, Safety and Capacity — San Francisco Share Improvement to BART stations related to customer experience and accommodating more passengers	**Investment:** Funds street level improvements between BART and Muni system	$0.71	$0.11	$0.11	
Bayview Caltrain Station New Caltrain station in the Bayview station to restore service	**Investment:** Fully funds a new station in the Bayview; cost assumes the Oakdale location	$0.10	$0.10	$0.10	
Mission Bay Ferry Landing Mission Bay ferry terminal for regional service	**Investment:** Fully funds need	$0.06	$0.06	$0.06	X
Next Generation Transit Investments Major transit projects to improve connections within the city and to the region (e.g. central subway extension, Geary/19th Ave Rail, Link 21)[1]	**Investment:** Funds initial planning phases for project development **Vision:** Additional investments for project advancement and funding that could be used for implementation of one mid-size transit extension or put towards a larger project	$3.95	$0.18	*	
Regional and Local Express Bus — Capital Investments New buses for expanded express bus	**Investment:** Funds approximately 10% of need	$0.12	$0.01	$0.01	
Paratransit					
SFMTA Paratransit Operations Paratransit door-to-door van, taxi, and other transportation services for seniors and people with disabilities who are unable to use fixed route transit service	**Investment:** Fully funds need	$1.27	$1.27	$1.27	

1 A large portion of need is not shown because these next generation transit projects are being developed and costs are unknown. Costs are currently estimated to be about $50B.

PROGRAM	INVESTMENT LEVEL	NEED ($B, 2020)	INVESTMENT PLAN ($B, 2020)	VISION PLAN ($B, 2020)	RESILIENCE CO-BENEFIT
Streets and Freeways					
Maintenance, Rehabilitation, and Replacement					
Street Resurfacing, Rehabilitation and Maintenance Maintains San Francisco's streets, sidewalks, and bike lanes for 30 years	**Investment:** Maintains current overall current condition, consistent with City Capital Plan (PCI score 75)[1]	$2.45	$2.45	$2.45	X
Increased Street Resurfacing, Rehabilitation and Maintenance Additional cost to further improve conditions of San Francisco's streets, sidewalks, and bike lanes for 30 years	**Investment:** Does not fund need	$4.37	$0	$0	
Signs and Signals Maintenance and Rehabilitation Upgrades San Francisco's signs and signals for 30 years	**Investment:** Funds approximately 12% of need **Vision:** Increases funding to approximately 50%	$1.69	$0.20	$0.85	
Pedestrian and Bicycle Facilities Maintenance Supports maintenance of paint, soft hit posts, and sidewalks	**Investment:** Funds approximately 50% of need	$0.25	$0.14	$0.14	X
Safe and Complete Streets					
Priority Active Transportation Network Improvements including closing gaps, expanding networks, and establishing mobility hubs	**Investment:** Funds 87 miles of improvements as defined in the ConnectSF Streets and Freeways Strategy[2]	$0.28	$0.28	$0.28	
Bicycle Improvements Planning, design, implementation for additional 120 miles of the active transportation network	**Investment:** Funds approximately 50% of need	$0.55	$0.28	$0.28	
Pedestrian Improvements Safety, walkability and neighborhood connectivity, and streetscape improvements	**Investment:** Funds approximately 15% of safety improvement needs **Vision:** Fully funds need for safety improvements	$4.86	$0.71	$1.41	X
Traffic Calming Includes street redesigns to slow traffic on neighborhood streets and biggest roads and automated photo traffic enforcement	**Investment:** Funds the majority of needs **Vision:** Fully funds need	$0.38	$0.37	$0.38	
Signs and Signals New signs and signals	**Investment:** Funds approximately 30% of need **Vision:** Increases funding to approximately 65%	$0.55	$0.16	$0.36	
Safe Routes to School Maintains and expands the current program	**Investment:** Funds approximately 25% of need **Vision:** Fully funds need	$0.06	$0.01	$0.06	
Vision Zero Education Programming to build support for safer streets	**Investment:** Funds approximately 65% of need	$0.06	$0.04	$0.04	
Curb Ramps Inspection and repairs of curb ramps	**Investment:** Funds approximately 37% of need	$0.46	$0.17	$0.17	
Tree Planting Planting and maintenance of new street trees	**Investment:** Funds approximately 35% of need	$0.23	$0.08	$0.08	X

1 https://www.onesanfrancisco.org/Draft-Plan-2022

2 https://connectsf.org/about/resources-and-media/

PROGRAM	INVESTMENT LEVEL	NEED ($B, 2020)	INVESTMENT PLAN ($B, 2020)	VISION PLAN ($B, 2020)	RESILIENCE CO-BENEFIT
Freeway Safety and Operational Improvements					
Vision Zero Ramp Safety Safety improvements at 30 freeway ramp locations in SF	**Investment:** Fully funds need defined in ConnectSF Streets and Freeways Strategy	$0.03	$0.03	$0.03	
Managed Lanes and Express Bus Capital investments for managed lanes network on US-101 and I-280 and purchase of buses to expand express bus service (operations costs excluded)	**Investment:** completion of Managed Lane and additional express bus service on US-101, from King St to Alemany Maze	$0.30	$0.20	$0.20	
Transformative Freeway & Major Street Projects Redesign major roads and freeways to improve connectivity and land use opportunities (e.g. Alemany Interchange; Alemany Stack; Geary Fill)[1]	**Investment:** Funds initial planning phases for project development **Vision:** Additional investments for project advancement	$0.90	$0.22	$0.47	X
Balboa Park Northbound I-280 On-Ramp Closure	**Investment:** Fully funds the study and implementation to improve safety	$0.01	$0.01	$0.01	
Balboa Park Southbound I-280 Off-Ramp Reconfiguration	**Investment:** Fully funds the redesign from a free-flow off ramp to a T-intersection	$0.02	$0.02	$0.02	
Transportation System Development & Management					
Transportation Demand Management					
Transportation Demand Management Parking and Pricing; Research and Evaluation; Mode Shift and Incentives; New Mobility (incl. pilots); Transit Education; Land Use	**Investment:** Funds approximately 50% of need	$0.08	$0.04	$0.04	
Treasure Island Capital Program Capital transportation improvements including West Side Bridges and YBI Multi-Use Path	**Investment:** Fully funds tolling, buses and shuttles, ferry vessel and landside equipment, and other capital costs	$0.45	$0.45	$0.45	
Treasure Island Mobility Management Program Operations Treasure Island Transportation Affordability Program	**Investment:** Fully funds program operations and affordability program	$1.25	$1.25	$1.25	
Downtown Congestion Pricing Program Downtown Pricing Program, including discounts, where revenues go towards increased transit service and bicycle, pedestrian, and transit infrastructure improvements	**Investment:** Fully funds the Congestion Pricing Program	$1.09	$1.09	$1.09	

1 The category includes initial planning for these efforts, full project costs are being developed.

PROGRAM	INVESTMENT LEVEL	NEED ($B, 2020)	INVESTMENT PLAN ($B, 2020)	VISION PLAN ($B, 2020)	RESILIENCE CO-BENEFIT
Transportation, Land Use, and Community Coordination					
Neighborhood Transportation Program Community based planning efforts for each supervisorial district	**Investment:** Fully funds need	$0.19	$0.19	$0.19	X
Equity Priority Transportation Program Community based planning efforts for underserved neighborhoods and areas with vulnerable population, as well as citywide equity evaluations and planning efforts	**Investment:** Fully funds need	$0.19	$0.19	$0.19	
Development Oriented Transportation Community based planning efforts to identify transportation improvements that support increased housing density in existing primarily low density neighborhoods	**Investment:** Fully funds need	$0.26	$0.26	$0.26	
Hunters Point Shipyard and Candlestick Point New local streets within the Hunters Point Shipyard and Candlestick Point area	**Investment:** Fully funds need	$0.50	$0.50	$0.50	
Citywide and Modal Planning Program Transportation studies and planning	**Investment:** Fully funds need	$0.03	$0.03	$0.03	
Transit Operations					
SFMTA Baseline Operations 2022 Muni Investment Levels	**Investment:** Fully funds 2022 Muni operations	$33.8	$33.8	$33.8	
SFMTA Operations Increment Increment investment to reach 2019 investment levels	**Vision:** Fully funds to 2019 investment levels	$5.96	$0	$5.96	
SFMTA Free Muni for Youth Free transit for all youth 18 years or younger	**Investment:** Fully funds need	$0.06	$0.06	$0.06	
Transit Strategy Additional Operations Operations related to Muni forward express bus	**Investment:** Does not fund need **Vision:** Funds approximately 10% of need	$5.26	$0	$0.44*	
BART Operations — San Francisco Share BART operations for 30 years	**Investment:** Nearly meets 2019 investment levels **Vision:** Fully funds 2019 investment levels	$9.90	$9.84	$9.90	
Caltrain Operations — San Francisco Share Caltrain operations for 30 years	**Investment:** Fully funds Caltrain electrification service of 6 trains per hour	$2.80	$2.80	$2.80	
Existing Obligations					
Debt Service/Existing Obligations	**Investment:** Fully funds need	$0.55	$0.55	$0.55	

* The about $2 billion of the new local/regional discretionary revenue in the Vision Plan could go towards these programs.

[this page intentionally left blank]

SFTP 2050: APPENDIX B

Revenue Assumptions Table

FUNDING SOURCES	COMMITTED	DISCRETIONARY	NOTSE ON ASSUMPTIONS
Previously committed funds	$1,668.62	-	Based on project funding plans
County Sales Tax Reauthoritzation (Prop K Reauth)	$550.00	$2,598.00	Based on SFCTA forecast with 2.4% growth rate; includes Priority 2
County VRF (Prop AA)	$74.88	-	Based on SFCTA forecast
County VRF Reauthorization (Prop AA Reauth)	-	$28.18	Based on SFCTA forecast
Developer Fees, Land Sales and Private Contributions	$674.00	-	Based on assumptions from TJPA and estimates for other pending development projects
DTX Passenger Facility Charges	$372.30	-	Based on assumptions from TJPA
Local funding for streets and roads (GO Bonds and General Fund)	$942.00	-	Estimate based on Public Works budgets
Local funding for street tree planting (General Fund and Adopt-a-Tree fund)	$29.00	-	Estimate based on Public Works budgets
Local Partnership Program - Formula	-	$39.31	Based on SFCTA forecast
Measure RR Caltrain Sales Tax	$734.54	-	Based on estimate of SF share of PBA 2050 forecasted revenues
Measure RR BART Bond	$661.34	-	Based on estimate of SF share of PBA 2050 forecasted revenues
OBAG — SF County Program	-	$256.09	Based on estimate of SF share of PBA 2050 forecasted revenues
RTIP	$84.56	$154.86	Based on estimate of SF share of forecasted revenues and existing project commitments
BART Fare Revenue	$5,106.57	-	Based on SF share of PBA 2050 transit operations funding
BART Non-Fare Revenue	$941.50	-	Based on SF share of PBA 2050 transit operations funding
Caltrain Fare Revenue	$1,216.64	-	Based on SF share of PBA 2050 transit operations funding
Caltrain Non-Fare Revenue	$137.36	-	Based on SF share of PBA 2050 transit operations funding
SF General Fund Transfer to SFMTA	$11,906.83	-	Based on PBA 2050 forecast
SF Port Revenues	$26.40	-	Based on project funding plan
SF Prop D/TNC Tax	$260.79	$260.79	Based on SFCTA and Controller's Office forecasts
SF Prop A SFMTA GO Bond	$234.00	-	Based on SFMTA expenditure plan
SF TSF	$961.00	-	Based on TSF expenditure plan
SFMTA Appropriated Fund Balance	$44.14	-	Based on PBA 2050 forecast
SFMTA Fare Revenue	$5,450.93	-	Based on PBA 2050 forecast, Controller's December 2021 report and SFMTA budget updates
SFMTA Paratransit Fare Revenue	$34.08	-	Based on PBA 2050 forecast, Controller's December 2021 report and SFMTA budget updates
SFMTA Rent, Advertising and Interest	$2,272.67	-	Based on PBA 2050 forecast
SFMTA Non-Fare Revenue (Fines, fees, permits, taxis and parking)	$10,009.74	-	Based on PBA 2050 forecast, Controller's December 2021 report and SFMTA budget updates
TFCA County Funds	-	$16.52	Based on PBA 2050 forecast
Treasure Island and Downtown Pricing Program Revenues	$2,210.70	-	Based on SFMCTA forecasts
Other Local (other county contributions to regional projects)	$200.00	-	Based on project funding plans
2% Toll Revenues	$3.10	-	Assumes historic SF share
5% State General Funds	$3.10	-	Assumes historic SF share
AB 1107 ½-cent Sales Tax in three BART Counties (75% BART Share)	$2,918.13	-	Based on estimated SF share of PBA 2050 forecasted revenues
AB 434 (Transportation Fund for Clean Air – Regional) – 60% of funding	-	$32.06	Assumes historic SF share
AB 664 (Bridge Tolls)	$216.86	-	Based on project funding plans
Active Transportation Program (ATP) - Regional Program	-	$61.72	Assumes historic SF share
Regional Measure 2 (RM2)	$14.83	-	Based on project funding plans
Regional Measure 3 (RM3)	$823.33	$176.67	Based on RM3 expenditure plan
Regional SFMTA Operating Grants	$3,091.30	-	Includes AB 1107 Muni share, RM2 operating funds, based on SFMTA operating budgets and PBA 2050 forecasted revenues

FUNDING SOURCES	COMMITTED	DISCRETIONARY	NOTSE ON ASSUMPTIONS
Active Transportation Program (ATP) - State Program	-	$31.00	Assumes historic SF share
Affordable Housing & Sustainable Communities Program	-	$410.75	Assumes historic SF share
Caltrans Planning Grants	-	$30.00	Assumes historic SF share
Cap & Trade Goods Movement (from 40% Uncommitted Funds)	-	$6.20	Based on regional framework and project funding plans
Gas Tax Adjustment	$69.46	-	Based on PBA 2050 forecast
Gas Tax Subvention + RMRA	$1,011.81	-	Assumes historic SF share
High Speed Rail Prop 1A	$550.00	-	Based on project funding plan
Local Partnership Program - Competitive	-	$27.53	Assumes historic SF share
SB1 - Local Planning	-	$6.20	Assumes historic SF share
Low Carbon Fuel Standard	$283.54	-	Based on SF share of PBA 2050 transit operations funding
Low Carbon Transit Operations Program Population-Based	$21.70	-	Assumes historic SF share
Low Carbon Transit Operations Program Revenue-Based	$330.12	-	Assumes historic SF share
Solutions for Congested Corridors	$33.00	$248.00	Based on project funding plans
State Bridges and Culverts	$120.35	-	Based on historic SF share
State Highway Operations & Protection Program (SHOPP)	$150.00	-	Based on historic SF share
State Transit Assistance (STA) Population-Based	-	$106.62	Based on historic SF share
State Transit Assistance (STA) Revenue-Based	$2,064.92	-	Based on historic SF share
State Transit Assistance Capital - Population Based	-	$18.85	Based on historic SF share
State Transit Assistance Capital - Revenue Based	$365.17	-	Based on historic SF share
Interregional Road/Intercity Rail (ITIP)	-	$6.20	Based on project funding plans
Trade Corridor Enhancement	-	$6.20	Based on project funding plans
Transit and Intercity Rail	-	$902.99	Based on historic SF share
FHWA Construction of Ferry Boats & Ferry Terminal Facilities Formula Program	$3.10	-	Assumes historic SF share
FHWA Highway Safety Improvement Program (HSIP)	$31.00	-	Assumes historic SF share
FHWA STP/CMAQ - Regional OBAG program	-	$708.64	Assumes historic SF share
FLAP Federal Lands Access Program	-	$70.00	Based on project funding plans
FTA Passenger Ferry Grant Program	$9.30	-	Assumes historic SF share
FTA Sections 5307 Urbanized Area Formula	$4,663.47	-	Assumes historic SF share
FTA Section 5309 Fixed-Guideway Capital Investment Grants - New Starts and Core Capacity	-	$4,000.00	Based on project funding plans and potential next generation of projects
FTA Section 5309 Fixed-Guideway Capital Investment Grants - Small Starts	-	$400.00	Based on project funding plans and potential next generation of projects
FTA Section 5337 State of Good Repair Formula	$1,634.00	-	Assumes historic SF share
FTA Bus and Bus Facilities Discretionary Program	-	$38.07	Assumes historic SF share
Highway Bridge Program	$62.00	-	Based on potentially eligible projects
National Highway Freight Program	$12.40	-	Based on potentially eligible projects
National Significant Freight and Highway Projects Discretionary Program	-	$12.40	Based on potentially eligible projects
Other Federal (ATCMTD, BUILD, UPP, HPP, FRA Funds)	$15.00	$47.00	Assumes historic SF share
Anticipated Unspecified	-	$2,893.33	Assumes SF share of regional forecast, includes IIJA/BIL revenues
TOTAL SFTP 2050 REVENUE FORECAST	**$65,305.56**	**$13,594.18**	

[this page intentionally left blank]

SFTP 2050: APPENDIX C

SF-CHAMP Analysis Methodology Memo

1. Overview

The San Francisco County Transportation Authority used the San Francisco Chained Activity Modeling Process (SF-CHAMP) to analyze future year investment scenarios for the San Francisco Transportation Plan 2050 (SFTP). This memo documents contents and evaluation methodology for the two scenarios modeled in the SFTP. Scenarios include the 2050 Baseline Scenario (Baseline) and the 2050 Investment Plan Scenario (Investment). Both scenarios use the same year 2050 land-use forecast and allocation but feature different transportation networks. The Baseline includes projects with fully committed funding while the Investment Plan includes everything in the Baseline Scenario and transportation projects which can be funded with anticipated revenues. Additional detail about the scenario development process is available in Appendix A.

This memo is divided into two sections. The first section documents what is included in the Baseline and Investment model scenarios. The second section documents evaluation metrics and how the Investment scenario performed when evaluated using SF-CHAMP for citywide and low-income populations. Appendix D documents the performance of the SFTP Investment Plan for specific Equity Priority Communities. The full SFTP Investment Plan contains some transportation investments which cannot be represented in SF-CHAMP; these were omitted from the Baseline and Investment scenarios.

2. Scenario Definitions

Two scenarios were developed for modeling in SF-CHAMP. Both scenarios represent conditions in 2050 and were modeled using SF-CHAMP version 6.1.2.

Baseline: The baseline scenario includes 2050 land use projections, year 2022 transportation systems, and future projects that are considered fully funded, shown in Table 2.

Investment Scenario: The investment scenario includes all Baseline projects and additional projects that can be funded with existing and expected new revenue sources, shown in Table 3. Not all projects and programs funded in the SFTP can be modeled; the Investment Scenario only includes projects that can be both fully funded and modeled.

LAND USE

The SFTP uses land use forecasts developed for Plan Bay Area 2050 (PBA50)[1]. PBA50 forecasts are made at the regional TAZ level. SF-CHAMP uses the San Francisco

1 https://www.planbayarea.org/plan-bay-area-2050-1

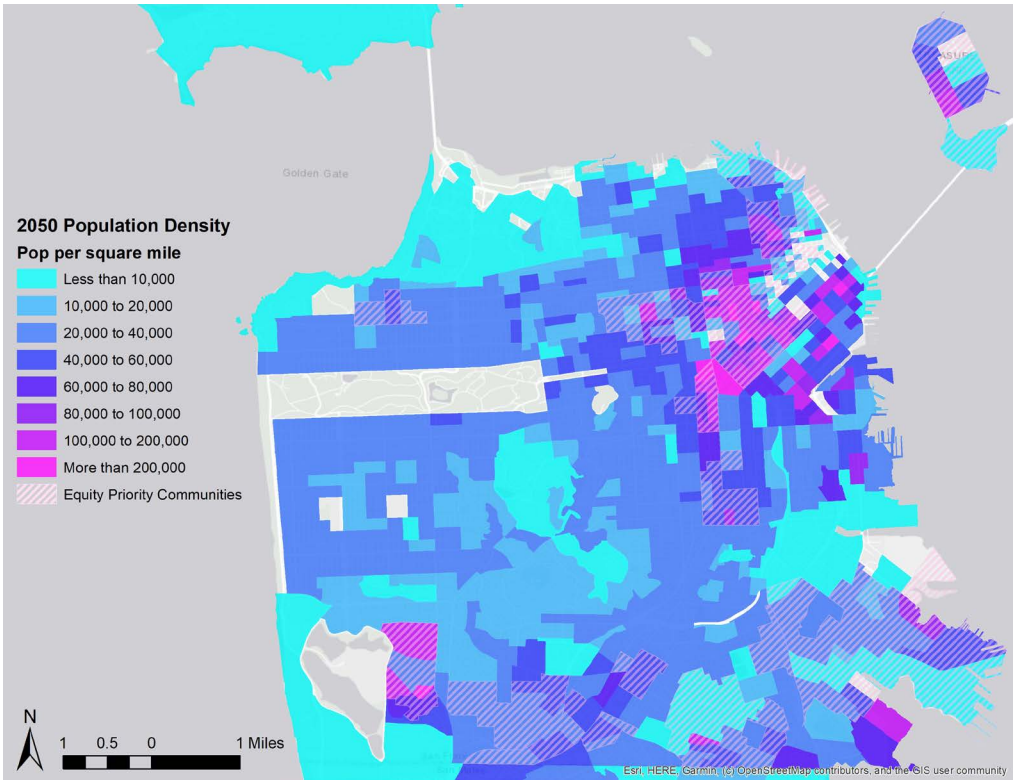
Transportation Analysis Zones (SFTAZ) for representing land use in transportation modeling, a smaller geographic unit than MTC's TAZ system. Land use distribution to SFTAZs within San Francisco is based on San Francisco Planning Department allocations of Plan Bay Area 2040 (PBA40) land use, and the 2040 – 2050 ten-year land use growth increment developed by the San Francisco Planning Department for the ConnectSF Statement of Needs[1]. Final San Francisco Planning Department allocations of PBA50 were not completed in time for SFTP analysis.

Table 1, Figure 1, and Figure 2 show 2050 total land use and land use density projections used for SFTP modeling.[2]

Table 1: SFTP Land Use Forecasts

LOCATION	YEAR	HHS	POP.	EMPLOYED RESIDENTS	JOBS
San Francisco	2050 (PBA50)	578,370	1,272,809	708,929	918,214
Bay Area	2050 (PBA50)	4,043,312	10,325,405	5,419,492	5,408,460

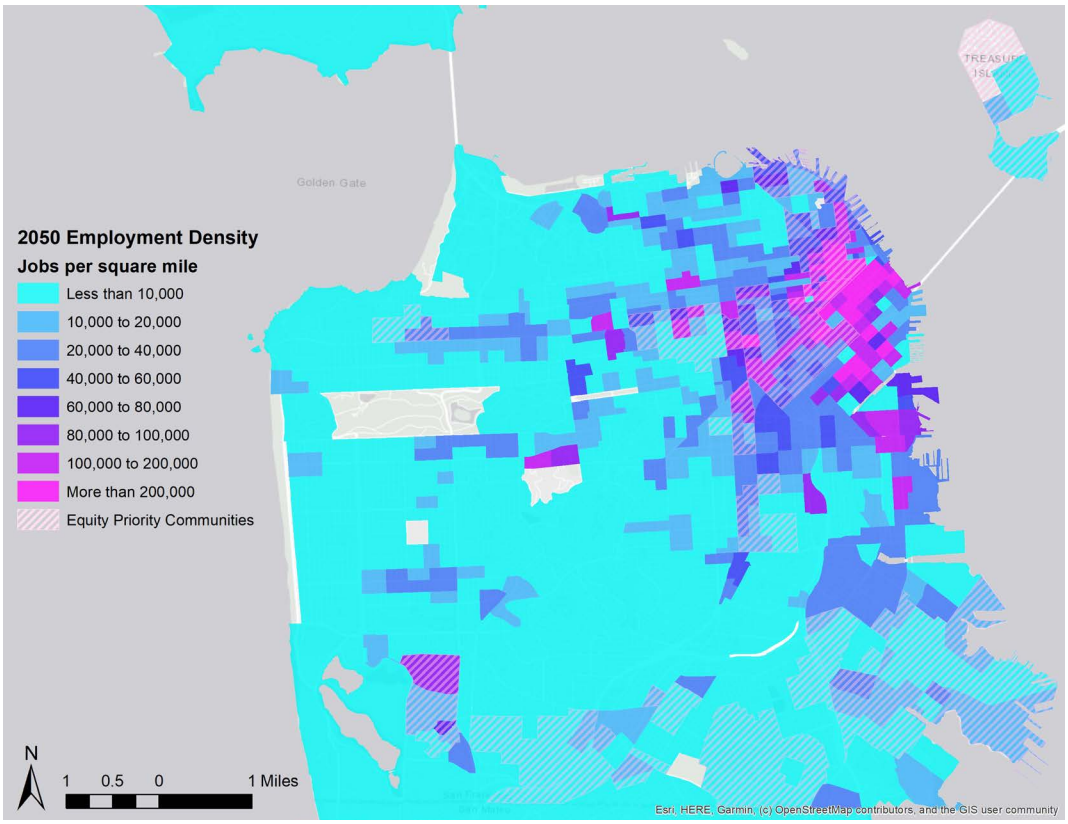
Figure 1: SFTP Land Use 2050 – Map of Population Density



1 https://connectsf.org/wp-content/uploads/ConnectSF_Statement-of-Needs-Report-Final.pdf

2 Land Use Forecasts for the SFTP were different than forecasts used for the ConnectSF Statement of Needs. The ConnectSF Statement of Needs used forecasts from Plan Bay Area 2040

Figure 2: SFTP Land Use 2050 – Map of Employment Density



TRANSPORTATION NETWORK ASSUMPTIONS

The SFTP was developed as the COVID-19 pandemic (the Pandemic) drastically altered travel behaviors, San Francisco's transit network, and the transportation funding ecosystem. The SFTP responded to these unprecedented and changing circumstances by using Muni service levels from Summer 2022 as a starting point for the Baseline scenario. This differs from regional long-range transportation plans which used pre-Pandemic assumptions for transit service levels. The pandemic has created uncertainty about long term travel behavior trends and while the possibility for changes in transit ridership and service provision remain, the SFCTA believes these are reasonable transit service assumptions for forecasting purposes.

Baseline Scenario

The Baseline Scenario includes:

- Summer 2022 SFMTA transit service, including Muni bus and Metro service that was planned to be in operation in Summer 2022.[1]

1 https://www.sfmta.com/projects/2022-muni-service-network

- 2019 BART service levels including 15-minute headways on all lines.
- Post-electrification Caltrain service, including 6 trains per hour during peak periods.
- Fully committed transportation projects, and developer committed transportation projects.
- All transportation projects open as of May 2022.

Table 2: 2050 Baseline Scenario Transportation Network Definition

PROJECT	DESCRIPTION
SF Transit	
Muni Baseline Service	Summer 2022 Muni Service (See Attachment A)
Muni Central Subway	New Light Rail Transit (LRT) extension from 4th St. and King St. to Chinatown, including four new stations. 6 minute headways for two separate services — a full T service and a T-short service which operates between Chinatown and 19th St.
Committed Muni Forward Projects	Muni Forward upgrades that are underway as of May 2022[1] such as 16th St Improvement Project, Mission Street SoMa Transit Improvements, L Taraval Improvement Project, Fulton St, Potrero Ave, and Haight St.
Geary Bus Rapid Transit Phase 1	Phase 1 of Geary Bus Rapid Transit (BRT) Project: Side running transit lanes east of Stanyan St.
Southeast Waterfront Transportation Improvements (including 28R extension as Geneva BRT, and Geneva Ave extension)	Transit facilities, pedestrian paths, and dedicated bicycle lanes throughout the Candlestick/Hunters Point Shipyard project area with connections to BART, T Third light rail, Caltrain, and local bus lines. The project includes an extension of Geneva Avenue from Bayshore Blvd. to Alana Way. This project includes the new CPX and HPX express bus routes and extensions or re-routes of the Muni 23, 24, 28R, 29, 44, and 48 lines. Some service frequencies on bus lines serving the Southeast Waterfront are improved per existing developer agreements[2].

1 https://www.sfmta.com/projects/muni-forward

2 https://sfocii.org/projects/hunters-point-shipyard-candlestick-point-2/document-library

PROJECT	DESCRIPTION
Regional Transit	
BART	15 minute peak and off-peak headways on all lines, including the existing extension to Berryessa (2019 service frequencies)
Caltrain Modernization	Post-electrification Caltrain — 6 trains per hour during peak periods service pattern
New BART Trains	Increases BART train length to ensure 10 car trains on all lines during peak periods
VTA Eastridge LRT Extension	Extend Valley Transportation Authority (VTA) light rail to Eastridge
Sonoma-Marin Area Rail Transit (SMART) to Windsor	Extend SMART north from Sonoma County Airport to Windsor
Local Road Projects	
San Francisco Streetscape Improvements	A variety of planned local street improvements to implement bike lanes, road diets, and transit improvements, including the Transit Center District Plan, Central SoMa streets*, San Bruno bike lane, California road diet, Geneva bike lane, 19th Ave, Embarcadero. *Brannan (2nd – 6th), Harrison bus lanes (2nd – 11th), Bryant (2nd – 7th), 3rd/4th (Market – King),
Hunters Point Shipyard and Candlestick Point Local Roads	Local roads constructed in Hunters Point and Candlestick Point as defined by existing developer agreements.
Treasure Island Capital Program	Bike path connecting the Bay Bridge Bike Path (east span) with Treasure Island. Realignment of Southgate Road, the key connection between I-80 ramps and local roads on Yerba Buena Island and Treasure Island.
Express Lane Projects	
SR-85	Express Lanes on SR-85 from SR-87 to US-101. MTC Assumed permissions and toll rates.
101 Express Lanes[1]	Express Lanes on US-101 from I-380 to SR-237. MTC Assumed permissions and toll rates.
SR-237	Express Lanes on SR-237 from I-880 to US-101. MTC Assumed permissions and toll rates.
580 Express Lanes	Express Lanes on I-580 from I-680 to Greenville Rd. MTC Assumed permissions and toll rates.
680 Express Lanes	Express Lanes on I-680 from Marina Vista to Alcosta and from the Alameda/Santa Clara county line to SR-84. MTC Assumed permissions and toll rates.
880 Express Lanes	Express Lanes on I-880 from Hegenberger to SR-237. MTC Assumed permissions and toll rates.

1 101 Express Lanes include equity discounts which are not included in the SF-CHAMP modeling

INVESTMENT SCENARIO

The Investment Scenario includes all projects noted in the Baseline Scenario and additional projects as shown in Table 3. Some projects and programs which are fully funded by the Investment Plan, such as freeway ramp safety improvements, cannot be modeled in SF-CHAMP. Such projects are not included in Table 3. The full list of projects and programs funded in the Investment Plan is available in Appendix A.

Table 3: Additional Transportation Projects Included in 2050 Investment Scenario

PROJECT	DESCRIPTION
SFMTA Baseline Operations (2022 service levels for bus, except where modified by SF Transit projects listed above, and 2019 service patterns and frequencies for rail)	Increase Muni Metro service levels from 2022 service to 2019 service. The K line operates at the same frequency as the K/T line in 2019, but runs solely between Balboa Park and Embarcadero stations due to the opening of the Central Subway in the Baseline Scenario.
Muni Reliability and Efficiency	Adds transit priority lanes and transit signal priority capital improvements for the 7, 8, 9, 14, 22, 28, 29, 30, 38, 49, M, N, and T. Does not include service frequency changes. Transit priority is added on any street without existing transit priority where there are at least two auto lanes in a given direction of travel.
Muni Rail Core Capacity	Extend N and M Parkmerced Muni Metro routes to 3-car train lengths
Caltrain Downtown Rail Extension (DTX)	Extend Caltrain from 4th and King to Salesforce Transit Center
F Line Extension	Extend SFMTA F Line to Aquatic Park
Bayview Caltrain Station	Add an additional Caltrain station near Oakdale Avenue in the Bayview neighborhood. Assumes that local Caltrain services stop at Oakdale (4 trains per hour at peak) and express services (2 trains per hour at peak) bypass Oakdale.
Mission Bay Ferry Landing	Add a ferry landing and ferry service to Mission Bay
Priority Active Transportation Network	A combination of quick build and permanent bike lane improvements on the core network recommended in the Active Transportation Study, including mobility hubs
Balboa Park Ramps: Northbound I-280 on ramp Closed	Close the northbound Geneva Ave on-ramp to I-280
Balboa Park Ramps: Southbound I-280 Off-Ramp Reconfiguration	Realign the existing Southbound Ocean Avenue off-ramp from I-280 from a free flow right turn to a signalized T-intersection.
Treasure Island Mobility Management Program Operations	Transit improvements for Treasure Island including increased Muni bus service (improved 25 line frequency and new 109 line), new AC Transit service, local on-island shuttles, new ferry service, and I-80 ramp tolling. New local streets are included in the Baseline.
Downtown Congestion Pricing Program	Implements northeast congestion pricing cordon and increases frequency on transit lines which serve the downtown cordon. Adds 68 one-way Muni bus runs during the AM peak (3-hour) period and 75 additional one-way Muni bus runs during the PM peak (3-hour) period. Increases regional bus service serving the corridor by 18 one-way runs in the AM peak period and 22 one-way runs in the PM-peak period.
101/280 Managed Lanes	Southbound HOV3+ lanes on 101 between the San Francisco / San Mateo county line and the I-280 Interchange. HOV3+ on I-280 between the US-101 interchange and King St in both directions.

3. Performance Metrics

Table 4, below, lists the performance measures SFTP used to evaluate the effectiveness of the Investment Scenario. The performance measures are generally based on metrics applied in previous ConnectSF efforts, including the Statement of Needs and Transit Corridor Study. Metrics shown in purple and marked with an asterisk (*) were evaluated quantitatively through SF-CHAMP modeling and are detailed in Table 4.

Table 4: Goals and Performance Metrics

ENVIRONMENTAL SUSTAINABILITY	ECONOMIC VITALITY	SAFETY & LIVABILITY	ACCOUNTABILITY & ENGAGEMENT
Mode share*	Job access*	Likely reduction in injuries/ fatalities	Street maintenance investment levels
Vehicle Miles Traveled*	Transit crowding*		Transit maintenance investment levels
Greenhouse Gas Emissions*	Average Commute Times*		Jobs created/maintained
	Transportation Affordability		

The SFTP uses an equity evaluation strategy which measures the impacts of investment scenarios on specific citywide populations as well as impacts on individual EPCs. This will allow planners to understand the equity impacts of the investment plan and whether projects are responding to the needs of individual EPC neighborhoods. Additional detail and results of the Equity assessment can be found in Appendix D. Table 5 provides additional detail about how, and for which populations, metrics were measured.

Table 5: Key Performance Metrics

METRIC	BREAKDOWN				DETAIL
	CITYWIDE	LOW-INCOME	EPC	OTHER	
Mode Share	X	X	X	Trips To/From/Within SF Regional Trips — East Bay Regional Trips — Peninsula/SB	SF-CHAMP's activity-based model estimates trips taken by residents of the 9 county Bay Area (SF-CHAMP also estimates commercial, truck, visitor, and internal-external trips, but these are not included in this summary)
Vehicle Miles Traveled (VMT)	X			On City Streets, Per SF Resident	Vehicle Miles Traveled is measured two ways: Total miles on San Francisco Streets (all vehicles when operating within San Francisco) Miles traveled per San Francisco household (personal travel only, anywhere in the Bay Area)
Greenhouse Gas Emissions (GHG)	X			On City Streets, Per SF Resident	Greenhouse Gas Emissions is measured two ways: GHG emitted within San Francisco (all vehicles when operating within San Francisco) Average GHG emissions per San Francisco resident (personal travel only, anywhere in the Bay Area)
Traffic Exposure			X		VMT on roads located inside or within ¼ mile of EPC boundaries
Job Access	X	X	X	Transit (45 minutes), Driving (30 minutes), Regional Transit (75 minutes)	The average number of jobs accessible for a household within a certain time range by a certain mode during the AM peak period.
Transit Crowding	X			Muni Non-Muni	Percent of passenger miles across the transit network which experience crowded conditions.
Average Commute Times	X	X	X	Driving Transit	Estimated average total trip time for weekday one-way commute trips to work and school. Separate breakdowns are available for driving and transit travel modes.
Reduction in injuries/ fatalities			X		Off-model analysis; See Appendix D

4. Citywide Results

Tables in this section show results from SF-CHAMP modeling for citywide, regional, and low-income populations. Information about the modeling process and results for San Francisco's EPCs is available in Appendix D.

Table 6: SFTP Investment Scenario Results Summary

MODE SHARE SHIFT	VMT / GHG	JOB ACCESS	COMMUTE TIME	TRANSIT CROWDING
High impact	**High Impact**	**Moderate Impact**	**High Impact**	**No benefit**
Transit trips increase by over 4% citywide and transit mode share expands by 1% while driving mode shares shrink more than 1%	VMT and GHG both fall by over 3%	Transit job access increases over 8%. Auto and regional transit job access also improve by 1 – 2%.	Transit commute times fall by almost 3%, saving commuters about 7 hours per year. Driving commute times are either unchanged or fall modestly.	Crowding increases, but most transit passenger miles (79% Muni, 85% regional) remain uncrowded.

Table 7: Significance Thresholds for Select Metrics

METRIC	DETAIL	SIGNIFICANCE THRESHOLDS
Mode share	Sum of increase in transit mode share and decrease in driving mode share.	1% for high, 0.5% for med, 0.2% for some
GHG	Changes in GHG released by vehicles on San Francisco roads and per capita auto GHG emissions	More than 1% drop for high, 0.4% for med, 0.1% for some
Job Access	Average of percent change in job access within 30-minutes driving and 45 minutes on transit.	>10% for high, >2% for med, >1% for some
Transit crowding	Decrease in share of transit in-vehicle passenger miles in crowded conditions.	>5% for high, >2% for med, >1% for some
Commute Time	Decrease in school and work commute time, measured separately for transit and driving	<-2% for high, <-1% for med

Table 8 shows Baseline and Investment Scenario model results for mode share. The investment plan has a high effect on mode share, both for all trips to/from/within SF, and for trips to/from/within SF made by low-income residents. For both groups, transit mode share rises by 3 – 5%, while driving mode share decreases by about 2%.

Table 8: Mode Share

	BASELINE	INVESTMENT	CHANGE	PCT CHANGE
All Trips To/From/Within SF				
Transit	21%	22%	1.0%	5.0%
Drive / TNC	62%	60%	-1.3%	-2.1%
Walk	15%	15%	0.3%	1.7%
Bike	2.7%	2.7%	0.0%	1.1%
Trips by People with Low Incomes To /From /Within SF				
Transit	25%	26%	0.8%	3.0%
Drive / TNC	51%	50%	-0.9%	-1.7%
Walk	21%	21%	0.1%	0.6%
Bike	3.2%	3.2%	0.0%	0.1%
SF Trips To/From East Bay				
Transit	42%	43%	0.8%	2.0%
Drive / TNC	58%	57%	-0.8%	-1.5%
Walk	0.0%	0.0%	0.0%	-
Bike	0.0%	0.0%	0.0%	-
SF Trips To/From Peninsula or South Bay				
Transit	17%	18%	0.9%	5.4%
Drive / TNC	81%	80%	-1.0%	-1.2%
Walk	1.3%	1.4%	0.0%	2.9%
Bike	1.3%	1.3%	0.0%	0.2%

Table 9 and Table 10 show Baseline and Investment Scenario model results for vehicle miles traveled and greenhouse gas emissions. The Investment Plan has a high effect on greenhouse gas emissions made by SF residents, and a high effect on greenhouse gas emissions for driving in San Francisco.

Table 9: Vehicle Miles Traveled

	BASELINE	INVESTMENT	CHANGE	PCT CHANGE
Vehicle miles traveled within San Francisco (THOUSANDS)	11,800	11,400	-0.4	-3.6%
Weekday Per Capita SF Resident VMT	6.5	6.2	-0.3	-3.9%

Table 10: Greenhouse Gas Emissions

	BASELINE	INVESTMENT	CHANGE	PCT CHANGE
GHG emissions from driving within San Francisco (lbs of CO2e, THOUSANDS)	8,700	8,500	-0.3	-3.3%
SF Resident GHG Per Capita (lbs of CO2e)	3.2	3.0	-0.1	-3.9%

Table 11 shows a moderate increase in job accessibility for both San Francisco residents and the subset of San Francisco residents with low incomes. 45-minute transit job access increases by at least 6% for both groups, while job access by auto increases by about 2%.

Table 11: Job Access

	BASELINE	INVESTMENT	CHANGE	PCT CHANGE
SF Resident 45 Minute Transit Job Access (THOUSANDS)				
All residents	593	640	47	8.0%
Low income	635	676	40	6.4%
SF Resident 30 Minute Auto Job Access (THOUSANDS)				
All residents	1,120	1,140	20	1.7%
Low income	1,140	1,160	23	2.0%
Regional Resident 75 Minute Transit Job Access (THOUSANDS)				
All residents	340	344	4.9	1.4%
Low income	448	454	5.9	1.3%

Table 12 shows that transit crowding increases in the investment plan scenario, however most transit passenger miles (79% Muni, 85% regional) remain uncrowded.

Table 12: Transit Crowding

	BASELINE	INVESTMENT	CHANGE	PCT CHANGE
SFMTA				
Passenger miles of crowding (thousands)	438	534	96	21.9%
Crowded % of passenger miles	20.1%	21.8%	1.7%	8.5%
Regional Operators				
Passenger miles of crowding (thousands)	1,520	1,640	124	8.2%
Crowded % of passenger miles	12.5%	13.3%	0.8%	6.5%

Table 13 shows that transit commute times decrease in the investment plan scenario, while driving commutes are moderately faster or remain unchanged.

Table 13: Commute Times

	BASELINE	INVESTMENT	CHANGE	PCT CHANGE
Commute time (minutes, any mode)				
All residents	22.0	21.8	-0.2	-0.8%
Low income	22.3	22.0	-0.3	-1.4%
Transit commute time (minutes)				
All residents	28.3	27.5	-0.8	-2.9%
Low income	29.2	28.1	-1.1	-3.8%
Drive commute time (minutes)				
All residents	20.1	20.0	-0.1	-0.6%
Low income	17.1	17.3	0.3	1.4%

Table 14 shows that the in vehicle speed experienced by transit riders on San Francisco streets increases approximately 15% in the Investment Plan scenario. Vehicle speeds are reduced slightly in the investment plan scenario.

Table 14: Transit and Traffic Speeds

	BASELINE	INVESTMENT	CHANGE	PCT CHANGE
Average transit vehicle speed experienced on San Francisco streets (MPH)	10.4	11.9	1.5	14.8%
Average vehicle speed on San Francisco streets (MPH)	18.8	18.1	-0.8	-4.0%

Attachment A. Summer 2022 Muni Service

Table 15: Assumed Summer 2022 SFMTA Service Headways by Time of Day in Minutes

ROUTE	AM PEAK	MIDDAY	PM PEAK	EVENING
1	7.0	7.0	7.0	20.0
1-Short	8.0	8.0	8.0	0.0
2	15.0	15.0	15.0	40.0
5	8.0	8.0	8.0	18.0
5R	10.0	10.0	11.0	0.0
6	20.0	20.0	20.0	60.0
7	12.0	12.0	12.0	30.0
8AX	8.0	0.0	8.0	0.0
8BX	8.0	0.0	8.0	0.0
8X	7.0	7.0	7.0	20.0
9	10.0	10.0	10.0	26.0
9R	10.0	10.0	10.0	0.0
10	15.0	15.0	15.0	40.0
12	7.5	7.5	7.5	30.0
14	7.0	10.0	8.0	16.0
14R	10.0	10.0	10.0	30.0
15	10.0	10.0	10.0	30.0
17	20.0	20.0	20.0	40.0
18	20.0	20.0	20.0	40.0
19	15.0	15.0	15.0	30.0
21	15.0	15.0	15.0	40.0
22	6.0	6.0	7.0	14.0
23	20.0	20.0	20.0	60.0
24	10.0	10.0	10.0	26.0
25	15.0	15.0	15.0	40.0
27	15.0	15.0	15.0	34.0
28	12.0	12.0	12.0	34.0

ROUTE	AM PEAK	MIDDAY	PM PEAK	EVENING
28R	10.0	10.0	10.0	0.0
29	9.0	9.0	9.0	30.0
30	12.0	12.0	12.0	30.0
30-Short	12.0	12.0	12.0	30.0
31	20.0	20.0	20.0	60.0
33	15.0	15.0	15.0	40.0
35	30.0	30.0	30.0	60.0
36	30.0	30.0	30.0	60.0
37	24.0	20.0	20.0	60.0
38	16.0	16.0	20.0	30.0
38-Short	16.0	16.0	20.0	0.0
38R	6.0	6.0	6.0	20.0
39	0.0	20.0	20.0	0.0
43	12.0	12.0	12.0	30.0
44	12.0	12.0	12.0	34.0
45	11.0	12.0	13.0	30.0
48	15.0	15.0	15.0	40.0
49	6.0	7.0	6.0	30.0
52	20.0	20.0	20.0	48.0
54	20.0	20.0	20.0	60.0
55	15.0	15.0	15.0	40.0
56	20.0	20.0	20.0	40.0
58	30.0	30.0	30.0	60.0
59	10.0	8.0	8.0	24.8
60	10.0	8.0	8.0	24.8
61	6.0	8.0	8.0	15.5
66	20.0	20.0	20.0	40.0
67	20.0	20.0	20.0	40.0
F	17.0	12.0	13.0	34.0
J	15.0	15.0	15.0	40.0
K	10.0	10.0	10.0	30.0
L-Bus	10.0	10.0	10.0	30.0
M	11.0	10.0	11.0	30.0
N	10.0	10.0	10.0	20.0

* Summer 2022 service frequencies used in SFTP modeling were provided in Spring of 2022 and may not match actual conditions perfectly

Attachment B. Baseline Scenario Muni Service

Table 16: Assumed 2050 Baseline Scenario SFMTA Service Headways by Time of Day in Minutes

ROUTE	AM PEAK	MIDDAY	PM PEAK	EVENING
1	7.0	7.0	7.0	10.0
2	15.0	15.0	15.0	20.0
5	8.0	8.0	8.0	9.0
6	20.0	20.0	20.0	30.0
7	12.0	12.0	12.0	15.0
8	7.0	7.0	7.0	10.0
9	10.0	10.0	10.0	13.0
10	15.0	15.0	15.0	20.0
12	7.5	7.5	7.5	15.0
14	7.0	10.0	8.0	8.0
15	10.0	10.0	10.0	15.0
17	20.0	20.0	20.0	20.0
18	20.0	20.0	20.0	20.0
19	15.0	15.0	15.0	15.0
21	15.0	15.0	15.0	20.0
22	10.0	12.0	10.0	15.0
23	20.0	20.0	20.0	30.0
24	7.5	10.0	7.5	15.0
25	7.5	10.0	5.0	10.0
27	15.0	15.0	15.0	17.0
28	12.0	12.0	12.0	17.0
29	10.0	10.0	10.0	15.0
30	12.0	12.0	12.0	15.0
31	20.0	20.0	20.0	30.0
33	15.0	15.0	15.0	20.0
35	30.0	30.0	30.0	30.0
36	30.0	30.0	30.0	30.0
37	24.0	20.0	20.0	30.0
38	16.0	16.0	20.0	15.0
39	0.0	20.0	20.0	0.0
43	12.0	12.0	12.0	15.0
44	12.0	12.0	12.0	17.0
45	11.0	12.0	13.0	15.0
48	10.0	15.0	10.0	20.0
49	6.0	7.0	6.0	15.0
52	20.0	20.0	20.0	24.0
54	20.0	20.0	20.0	30.0
55	15.0	15.0	15.0	20.0
56	20.0	20.0	20.0	20.0

ROUTE	AM PEAK	MIDDAY	PM PEAK	EVENING
58	15.0	15.0	15.0	20.0
58	30.0	30.0	30.0	30.0
59	10.0	8.0	8.0	12.4
60	10.0	8.0	8.0	12.4
61	6.0	8.0	8.0	15.5
66	20.0	20.0	20.0	20.0
67	20.0	20.0	20.0	20.0
14R	10.0	10.0	10.0	15.0
1-Short	8.0	8.0	8.0	0.0
22-Short	10.0	12.0	10.0	0.0
28R	8.0	10.0	8.0	30.0
29-Short	10.0	0.0	10.0	0.0
38R	6.0	6.0	6.0	10.0
38-Short	16.0	16.0	20.0	0.0
5R	10.0	10.0	11.0	0.0
8AX	8.0	0.0	8.0	0.0
8BX	8.0	0.0	8.0	0.0
9R	10.0	10.0	10.0	0.0
CPX	15.0	30.0	15.0	30.0
F	17.0	12.0	13.0	17.0
HPX	12.0	30.0	12.0	30.0
J	15.0	15.0	15.0	20.0
K	10.0	10.0	10.0	15.0
L-Bus	10.0	10.0	10.0	15.0
M	17.0	10.0	17.0	10.0
M Parkmerced	17.0	0.0	17.0	0.0
N	10.0	10.0	10.0	10.0
T	8.0	10.0	8.0	15.0
T-Short	8.0	10.0	8.0	0.0

Attachment C. Investment Plan Muni Service

Table 17: Assumed 2050 Investment Scenario SFMTA Service Headways by Time of Day in Minutes

ROUTE	AM PEAK	MIDDAY	PM PEAK	EVENING
1	7.0	7.0	7.0	10.0
2	15.0	15.0	15.0	20.0
5	8.0	8.0	8.0	9.0
6	20.0	20.0	20.0	30.0
7	12.0	12.0	12.0	15.0
8	7.0	7.0	7.0	10.0
9	10.0	10.0	10.0	13.0
10	15.0	15.0	15.0	20.0
12	7.5	7.5	7.5	15.0
14	7.0	10.0	8.0	8.0
15	10.0	10.0	10.0	15.0
18	20.0	20.0	20.0	20.0
19	15.0	15.0	0.0	15.0
21	15.0	15.0	15.0	20.0
22	9.0	12.0	9.5	15.0
23	20.0	20.0	20.0	30.0
24	7.5	10.0	7.5	15.0
25	7.5	10.0	5.0	10.0
27	15.0	15.0	15.0	17.0
28	12.0	12.0	12.0	17.0
29	10.0	10.0	10.0	15.0
30	11.3	12.0	12.0	15.0
31	20.0	20.0	20.0	30.0
33	15.0	15.0	15.0	20.0
35	30.0	30.0	30.0	30.0
36	30.0	30.0	30.0	30.0
37	24.0	20.0	20.0	30.0
38	16.0	16.0	18.0	15.0
39	0.0	20.0	20.0	0.0
43	12.0	12.0	12.0	15.0
44	12.0	12.0	12.0	17.0
45	10.4	12.0	13.0	15.0
48	9.5	15.0	10.0	20.0
49	6.0	7.0	6.0	15.0
52	20.0	20.0	20.0	24.0
54	20.0	20.0	20.0	30.0
55	15.0	15.0	15.0	20.0
56	20.0	20.0	20.0	20.0
57	20.0	20.0	20.0	20.0

ROUTE	AM PEAK	MIDDAY	PM PEAK	EVENING
58	15.0	15.0	15.0	20.0
58	30.0	30.0	30.0	30.0
59	10.0	8.0	8.0	12.4
60	9.5	8.0	8.0	12.4
61	6.0	8.0	0.0	15.5
66	20.0	20.0	20.0	20.0
67	20.0	20.0	20.0	20.0
109	12.0	30.0	12.0	30.0
14R	10.0	10.0	10.0	15.0
1-Short	8.0	8.0	8.0	0.0
22-Short	10.0	12.0	10.0	0.0
28R	8.0	10.0	8.0	30.0
29-Short	10.0	0.0	10.0	0.0
38R	6.0	6.0	5.5	10.0
38-Short	16.0	16.0	20.0	0.0
5R	10.0	10.0	11.0	0.0
8AX	8.0	0.0	7.3	0.0
8BX	8.0	0.0	7.1	0.0
9R	10.0	10.0	9.5	0.0
CPX	15.0	30.0	15.0	30.0
F	7.2	6.0	4.9	10.0
HPX	12.0	30.0	12.0	30.0
J	8.0	10.0	9.0	9.2
K	7.7	10.0	7.7	15.0
L	7.5	10.0	7.5	11.3
M	17.0	10.0	17.0	10.0
M Parkmerced	17.0	0.0	17.0	0.0
N	5.5	10.0	6.0	10.0
T	6.0	10.0	6.0	12.0
TI Shuttle1	10.0	10.0	10.0	10.0
TI Shuttle2	10.0	10.0	10.0	10.0
TI Shuttle3	10.0	10.0	10.0	10.0
T-Short	6.0	10.0	6.0	0.0

SFTP 2050: APPENDIX D

Equity Evaluation

Introduction

The San Francisco Transportation Plan (SFTP) is the citywide long-range investment and policy blueprint for San Francisco's transportation system. The plan considers all transportation modes, transit operators, and streets and freeways. The SFTP 2050 establishes the city's transportation investment priorities for the next 30 years and will position San Francisco for regional, state, and federal funding. The SFTP is updated every four years, along with Plan Bay Area (PBA), the region's long-range plan.

The SFTP 2050 is part of ConnectSF,[1] a multi-agency collaborative process to build an effective, equitable, and sustainable transportation system for San Francisco's future. This memo documents how equity, a central goal of ConnectSF, is incorporated and evaluated in the SFTP 2050.

EQUITY IN PAST SFTPS

Equity has been important to San Francisco's previous long-range transportation plans, however, the city's strategy for incorporating equity has evolved with each plan.

2004 Countywide Plan

The 2004 Countywide Plan included a goal to "ensure equity in transportation investments through a broad distribution of benefits among all city residents; minimizing the negative impacts of transportation." Key system performance measures were evaluated for target populations (low-income households; zero car households; female-headed households with children; and minority households). Analysis showed how the Countywide Plan performed differently for different groups.

2013 SFTP

The 2013 SFTP analyzed how transportation conditions such as safety, transit access, and reliability vary geographically in San Francisco. Conditions were compared between neighborhoods and for Communities of Concern – areas of the city with high concentrations of populations that could be considered disadvantaged or vulnerable (now called Equity Priority Communities or EPCs).[2] Results from the comparison helped shape the investment scenarios and funding was prioritized for projects which addressed identified inequities in the existing transportation system.

2017 SFTP Update

The 2017 SFTP Update combined a progress report on activities recommended in the 2013 SFTP with an updated look at sector needs and trends. The 2017 plan highlighted equity-focused studies designed to address the disparities identified in

1 https://connectsf.org/

2 https://www.sfcta.org/sites/default/files/2019-06/SFTP%20Appendix%20F%20Transportation%20Equity%20Analysis.pdf

2013. The 2017 SFTP also revisited project evaluations from 2013 with updated costs, scopes, new projects, and new Communities of Concern (now called Equity Priority Communities or EPCs).

SFTP 2050 and Sales Tax Reauthorization

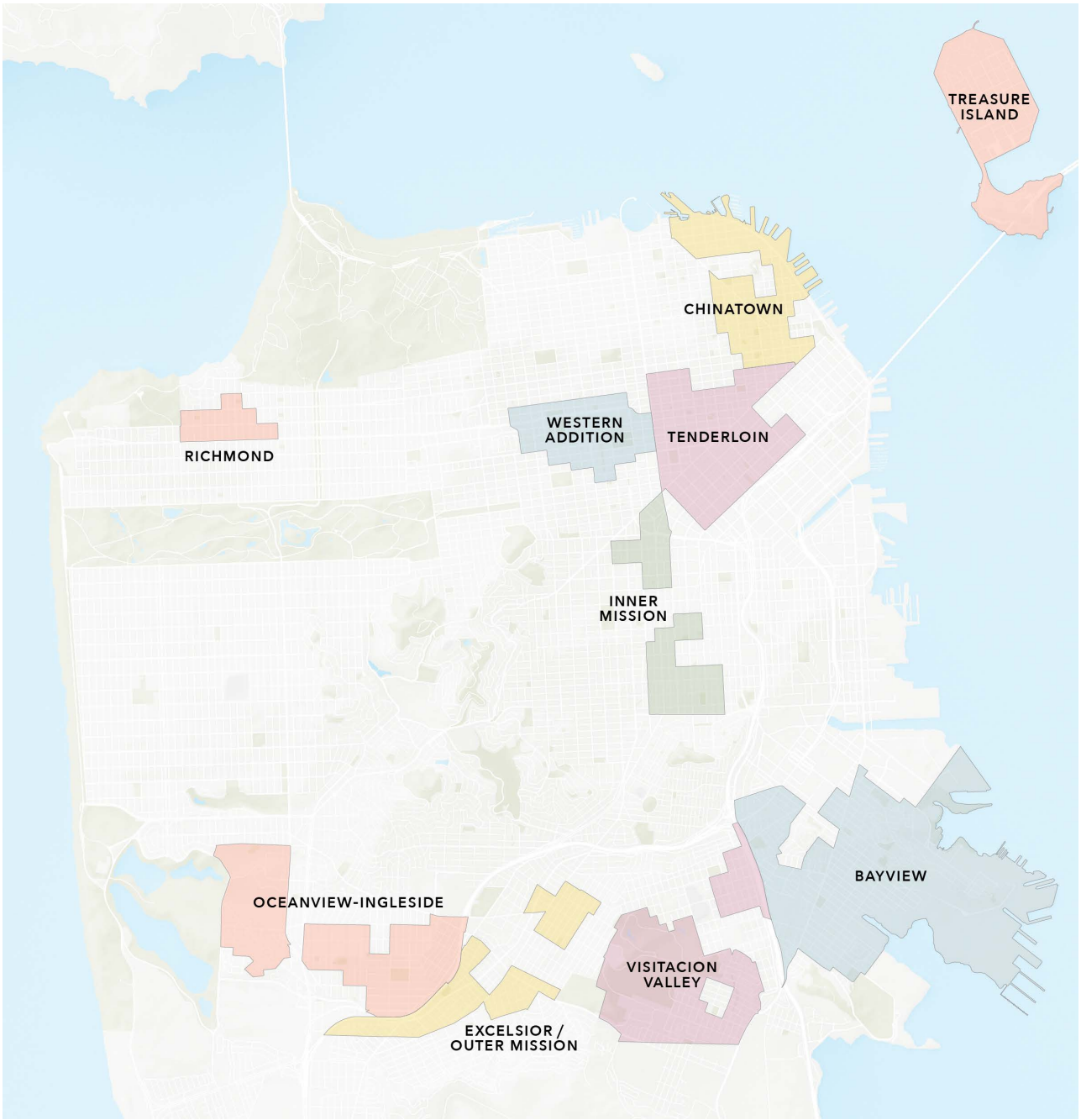
The SFTP 2050 is coordinated with the development of the 2022 Transportation Expenditure Plan. The SFTP defines the City's long-range transportation investment priorities, and the Expenditure Plan articulates which transportation projects will be eligible for local funding under a potential re-authorization of San Francisco's voter approved sales tax, Proposition K. The Expenditure Plan helps implement the priorities and long-term vision for the maintenance, development, and improvement of San Francisco's transportation system, as articulated in the SFTP.

Transportation equity in San francisco now

Equity is one of San Francisco's most important priorities for the transportation system and one of five ConnectSF Goals. To operationalize this goal, the San Francisco County Transportation Authority's (Transportation Authority) conducted an equity assessment for the 2022 Transportation Expenditure Plan,[1] which outlined how the current transportation system is advancing equity and where it falls short for EPCs across the city, shown in Figure 1.

1 https://www.sfcta.org/sites/default/files/2021-09/SFCTA_Equity-Assessment-for-New-Sales-Tax-Expenditure-Plan_2021-09-17_FINAL.pdf

Figure 1: Equity Priority Community Neighborhoods



SUMMARY OF FINDINGS FROM 2022 TRANSPORTATION EXPENDITURE PLAN EQUITY ASSESSMENT

The Equity Assessment found that transportation needs and challenges vary between EPC neighborhoods in San Francisco. Specific neighborhood needs can also differ from the needs of people with low incomes, people of color, people with disabilities, or other specific groups who live in every part of San Francisco.

- **Accessibility for Low Mobility Individuals:** Most households in Equity Priority Communities near downtown (Western Addition, Tenderloin, Chinatown, Inner Mission) have no vehicle available and rely on transit or other modes of transportation. A disproportionate number of households within Equity Priority Communities include one or more people with disabilities, impacting their options for getting around.
- **Transportation Costs:** Residents in Equity Priority Communities spend a greater percentage of their income on transportation than in other areas of the city. Some of the block groups where this challenge is most acute are in the Chinatown, Tenderloin, Western Addition, and Bayview neighborhoods.
- **Health Outcomes:** Many Equity Priority Communities are at elevated risk of developing cancer due to traffic exhaust in their neighborhoods.[1] The cancer risk is particularly high for the Tenderloin, Chinatown, and Western Addition neighborhoods.
- **Pedestrian and Bicycle Safety:** Most of the high-injury network[2] is concentrated in northeastern San Francisco, meaning that the Equity Priority Communities within the Tenderloin, Chinatown, Western Addition, and Inner Mission/Soma are disproportionately at risk of pedestrian or bicyclist injuries or fatalities.
- **Travel Time and Job Accessibility:** Equity Priority Communities in the Tenderloin, Chinatown, Western Addition, and Inner Mission neighborhoods have high job access by transit or vehicle because of their proximity to downtown and regional transit. However, within the Equity Priority Communities in the Bayview, Visitacion Valley, Excelsior/Outer Mission, Oceanview-Ingleside and Treasure Island many more jobs are accessible within a 30-minute drive than within 45 minutes on transit.

1 San Francisco Citywide Health Risk Assessment: Technical Support Documentation, accessed at www.sfdph.org/dph/files/EHSdocs/AirQuality/Air_Pollutant_Exposure_Zone_Technical_Documentation_2020.pdf

2 https://www.visionzerosf.org/maps-data/

- **Need for Robust Outreach:** While this research uncovers many important trends related to equity and transportation needs, addressing the remaining gaps and gaining a clear picture of Prop K's role in advancing equity will require ongoing robust outreach. The transportation needs of Equity Priority Communities differ geographically, suggesting the importance of engaging each Equity Priority Community individually when assessing the impacts of citywide or large-scale projects. Furthermore, while this research focused on geographic concentrations of disadvantage, outreach should solicit the opinions and experiences of the many marginalized individuals that live in less disadvantaged neighborhoods. Ongoing engagement will also be needed to better understand and prevent displacement and gentrification caused by transportation investments.

The 2022 Transportation Expenditure Plan Equity Assessment also found that people of color comprise a larger percentage of the population in Equity Priority Communities than they do in other areas of the city (Table 1). While Black and Hispanic or Latino people make up 2.7% and 11.5% of the population, respectively, in areas that are not Equity Priority Communities, they are 10% and 23% of the population in Equity Priority Communities. Census block groups with a large percentage of Black or Hispanic residents generally align with census block groups that are designated as Equity Priority Communities. The percentage of the population that identifies as Asian, Pacific Islander, Native American, two or more races, or another nonwhite race are also higher in EPCs than other areas.

Table 1: 2020 Race and Ethnicity in EPCs

RACE AND ETHNICITY	EPCS		NON-EPCS		CITYWIDE	
	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT
White Alone	92,594	32%	315,943	53.40%	408,578	46.30%
Black Alone	28,750	10%	16,274	2.70%	45,024	5.10%
American Indian Alone	1,806	1%	1,818	0.30%	3,624	0.40%
Asian Alone	114,816	40%	200,879	33.90%	315,691	35.80%
Pacific Islander Alone	2,290	1%	1,237	0.20%	3,527	0.40%
Some Other Race Alone	33,641	12%	25,148	4.20%	58,789	6.70%
Two or More Races	15,754	5%	30,803	5.20%	46,558	5.30%
Hispanic Origin (Any Race)	67,166	23%	68,019	11.50%	135,187	15.30%

Source: U.S. Census Bureau, Esri Forecasts for 2020, obtained through the "Demographic and Income" Profile at communityanalyst.arcgis.com

Equity Analysis Approach for SFTP 2050

OUTREACH AND ENGAGEMENT STRATEGY

Outreach for the SFTP built on previous engagement for the ConnectSF process and focused on understanding community priorities for discretionary revenues – those revenues with the most flexibility. Engagement included community presentations, a town hall, and online survey available in English, Spanish, Chinese, Russian, and Filipino.

The series of community presentations was designed to ensure active engagement with EPC residents. In Spring 2022, staff reached out to 45 organizations across the city to offer presentations as an opportunity to provide feedback on the SFTP. Meetings with Community Based Organizations in EPCs were prioritized. 13 groups received a presentation focused on collecting input on investment priorities. The team conducted three monolingual, non-English presentations: one in Spanish to La Raza Community Resource Center, and two in Cantonese to Community Youth Center of San Francisco and Self Help for the Elderly. Organizations that accommodated standalone presentations for their members or promoted the SFTP 2050 survey through social media were offered stipends. Additional information on the SFTP 2050 engagement strategy is available in Appendix E.

ANALYSIS

The SFTP uses an equity evaluation strategy which responds to the Expenditure Plan Equity Assessment findings by measuring the impacts of investment scenarios on the citywide population, on low-income households, and on residents of EPCs by neighborhood. This ensures that recommended investment scenarios advance equity by benefitting the citywide population, low-income households, and responding to the needs of individual EPC neighborhoods. Equity analysis for the SFTP 2050 measures the effects of investment scenarios on the populations below and compares results for these populations to outcomes for full San Francisco and regional populations:

- San Francisco Low-income residents (citywide)
- San Francisco EPC residents (citywide and by EPC neighborhood)
- Non-San Francisco low-income residents (analysis for job access only)
- Non-San Francisco EPC residents (analysis for job access only)

The definitions of EPC neighborhoods used for the evaluation are shown in Figure 1. EPC neighborhoods were defined by sorting San Francisco's EPC designated census

tracts[1] into groups using SFMTA's Equity Neighborhoods[2] as a guide for drawing boundaries. Major roads were used as dividers between EPC neighborhoods. Two clusters of census tracts were defined by the SFCTA as EPCs but were not Equity neighborhoods in SFMTA's Service Equity Strategy: Treasure Island, which is typically grouped together as part of the District 6 EPC, and a portion of the Richmond District, which is a new EPC as of 2021. These were defined as unique EPC neighborhoods for the purposes of SFTP analysis.

After defining EPC neighborhoods findings, from the 2022 Transportation Expenditure Plan Equity Analysis were used to identify specific needs for each EPC neighborhood (Table 2). The process for identifying key needs is detailed in Attachment A. Table 2 shows metrics which were defined to measure the impact of SFTP scenarios on key EPC needs.

Table 2: Key Needs by Equity Priority Community (EPCs)

EPC	HIGH TRANSPORTATION COSTS	EXCESS POLLUTION	LOW JOB ACCESS	HIGH DRIVING MODE SHARE	LONG COMMUTE TRAVEL TIMES	HIGH INJURIES
Chinatown	X	X				X
Tenderloin	X	X				X
Western Addition	X	X				X
Inner Mission		X				X
Bayview	X		X	X	X	
Excelsior/Outer Mission		X	X		X	
Visitacion Valley			X	X	X	
Oceanview-Ingleside			X	X	X	
Treasure Island			X	X	X	
Richmond			X	X	X	

The EPC needs-identification process highlighted that EPCs located close to downtown San Francisco (Chinatown, Tenderloin, Western Addition, Inner Mission) tend to have similar needs, and EPCs farther from downtown (Bayview, Excelsior/Outer Mission,

1 https://www.sfcta.org/policies/equity-priority-communities

2 Muni Service Equity Strategy – Page 7; https://www.sfmta.com/sites/default/files/reports-and-documents/2020/05/final_-_2020_muni_equity_strategy_0.pdf

Visitacion Valley, Oceanview-Ingleside, Treasure Island, Richmond) are also similar in their profile of demonstrated needs.

Investment scenarios were evaluated for citywide impacts on EPC residents, low-income households, and the general population. Impacts on individual EPCs were also evaluated for each of the five metrics in Table 3. Results demonstrate how the SFTP 2050 investments help address identified needs within each EPC and make progress on citywide goals.

Table 3: SFTP Metrics for Measuring EPC Needs

METRIC	DEFINITION
High Transportation Costs	It is not possible to model change in household transportation costs with a high degree of confidence. In lieu of a modelled, quantitative analysis, we evaluate transportation costs qualitatively to identify and elevate efforts to make transportation cheaper
Traffic Exposure[1]	VMT on links within a ¼ mile buffer of EPCs
Low Job Access	Change in transit job access (45 minutes)
High Driving Mode Share	Change in driving mode share
Long Commute Travel Times	Change in one-way work and school commute travel time
High Injuries	To measure transportation safety improvements, we determine which projects and programs included in the investment and vision scenarios are likely to include treatments shown to be effective at improving safety. We identify the EPCs where those treatments will be implemented and qualitatively evaluate their potential effect.

Four of the six metrics shown in Table 3 can be measured using the SFCTA's activity-based transportation demand model, SF-CHAMP. Thresholds to measure progress for these metrics are shown in Table 4. In other words, if the number of reachable jobs increases by 10%, this indicates an improvement in job access.

Table 4: Improves/Degrades thresholds for metrics measured with SF-CHAMP

	TRAFFIC EXPOSURE	JOB ACCESS	DRIVING MODE SHARE	COMMUTE TRAVEL TIMES
Improves	-2%	10%	-2%	-2%
Degrades	2%	-5%	2%	2%

1 Traffic Exposure is a proxy for measuring vehicle related pollution, as electric vehicle adoption rates between 2022 and 2050 will affect some vehicle rated pollution levels. Noise pollution and pollutants such as brake dust with known negative health impacts will still be created by electric vehicles

SF-CHAMP was not used to measure investment plan impacts to transportation costs or safety. These needs were measured qualitatively, as described below.

High Transportation Costs

The San Francisco Transportation Plan funds programs with the explicit goal of reducing transportation costs for San Franciscans that are most vulnerable to increasing transportation costs. These programs and their collective impact are reviewed in the following section.

High Injuries

SFTP 2050 safety benefits were assessed qualitatively using existing research on the safety benefits of specific investments. SFTP projects and programs that include improvements known to reduce the incidence of collisions were considered to have an impact on neighborhood safety.[1] Individual EPCs were scored based on the prevalence and effectiveness of safety improvements likely to be implemented within their boundaries.

Equity Analysis Findings for SFTP 2050

The SFTP investment plan addresses many of the needs identified through the 2022 Transportation Expenditure Plan Equity Priority Community Needs Analysis. SFTP investments will reduce traffic exposure and create infrastructure safety benefits within central EPCs which disproportionately suffer from pollution and transportation related injuries. Neighborhoods further from downtown see improved job access and reduced auto mode share, which are identified needs in those communities. Commute times are reduced for both transit and driving commutes. When analyzing commute trips by all modes, the average trip gets slightly faster for some neighborhoods and remains the same for others. This modest shift may reflect that transit is being used for more commutes.

The SFTP appears to benefit the Oceanview-Ingleside EPC less than other EPCs. Additional investigation into the types of projects and programs that could benefit Oceanview-Ingleside neighbors is needed in future technical analyses and transportation planning efforts, including transit or express bus service changes.

Table 5 shows the change for each evaluation metric by EPC neighborhood between the Baseline Scenario and the Investment Scenario. Cells are colored in green when the metric responds to an identified need for a particular EPC neighborhood.

1 http://www.cmfclearinghouse.org/ ; https://dot.ca.gov/-/media/dot-media/programs/local-assistance/documents/hsip/2020/lrsm2020.pdf

While the Investment Plan makes progress on many of the known EPC needs, San Francisco's transportation needs exceed available revenues in the Investment Plan. The SFTP Vision Plan includes potential new revenues which can be prioritized to further close equity gaps in EPC communities, using this analysis as a guide.

Table 5: Change in Key Equity Metrics for Equity Priority Community (EPCs)

EPC	TRAFFIC EXPOSURE	JOB ACCESS	DRIVING MODE SHARE	COMMUTE TRAVEL TIMES	INFRASTRUCTURE SAFETY BENEFIT
Chinatown	**-5%**	+6%	-5%	-1%	**HIGH**
Tenderloin	**-5%**	+1%	-4%	NO CHANGE	**HIGH**
Western Addition	**-3%**	-2%	-3%	NO CHANGE	**HIGH**
Inner Mission	**-4%**	+2%	-2%	NO CHANGE	**HIGH**
Bayview	-4%	**+17%**	**-2%**	+1%	**HIGH**
Excelsior/Outer Mission	**-4%**	**+25%**	-1%	**NO CHANGE**	MEDIUM
Visitacion Valley	-4%	**+41%**	**-1%**	**NO CHANGE**	MEDIUM
Oceanview-Ingleside	-5%	**+9%**	**-1%**	**+1%**	MEDIUM
Treasure Island	-6%	**+81%**	**-25%**	**-23%**	MEDIUM
Richmond	-1%	**+45%**	**-2%**	**-3%**	MEDIUM

Although the SFTP Equity Evaluation focused on impacts to EPCs within San Francisco, the impacts on specific citywide and regional populations were analyzed to understand changes to job access, mode share, and commute times. Table 6 shows that the SFTP investment scenario has a positive impact on these populations for three metrics modeled using SF-CHAMP.

Table 6: SFTP Investment Plan Impacts on Citywide and Regional Populations

	JOB ACCESS	DRIVING MODE SHARE	COMMUTE TRAVEL TIMES
All San Francisco Residents	+8%	-2%	-1%
All Regional*	+1%		
San Francisco: EPC residents (citywide)	+6%	-3%	-2%
Regional Non-SF: EPC residents*	+1%		
San Francisco: Low-income residents (citywide)	+6%	-2%	-1%
Regional Non-SF: Low-income residents*	+1%		

*Regional transit job access is defined as jobs within 75 minutes on transit

IMPACTS ON TRANSPORTATION COSTS

The SFTP Includes targeted policies and programs to reduce costs for low-income households specifically. Examples of these programs and policies include:

- **Free Muni for Youth:** the SFTP fully funds the SFMTA's current Free Muni for Youth pilot program for the 30-year plan period, ensuring that children under the age of 18 continue to have free access to public transit.
- **Treasure Island Affordability Program:** The Treasure Island Tolling Program could include an affordability program to offer low-income San Franciscans and existing island residents a transit pass and toll exemptions or discounts.
- **Regional Transit Fare Coordination:** San Francisco is working with the region on an effort (Seamless Bay Area) to coordinate and integrate transit fares. This effort is being led by the Metropolitan Transportation Commission and could lead to a more affordable transit network by providing free or reduced-cost transfers.

Some of the travel demand management projects included in the SFTP would include a charge on driving private vehicles during congested times and in congested parts of the network – see the 101/280 Managed Lanes and Bus Project and the Downtown Congestion Pricing Study (DTCP). Each of those project development processes has its own equity analysis and affordability program intended to minimize financial burden on low-income travelers, particularly those with lower transit access. For example, the DTCP Study found that means-based discounts and exemptions for low, very low, and moderate-income travelers are important for meeting equity goals and metrics. Also, the 101/280 Managed Lanes and Bus Project will analyze non-priced managed lanes options (i.e., High Occupancy Vehicle / Bus Only lanes).

Taken together, these policies and programs should have a positive impact on transportation costs citywide, specifically for low-income populations for whom cost is a barrier to mobility.

Attachment A. Source Data for Identifying Key Equity Metrics by Equity Priority Community (EPCs)

The EPC needs shown in Table 2 are based on data gathering and analysis conducted for the **Equity Assessment for the 2022 Transportation Expenditure Plan**. Table 7 below provides a summary of the specific metrics used and original source data.

Table 7: Data source used for EPC needs identification

	HIGH TRANSPORTATION COSTS	EXCESS POLLUTION	LOW JOB ACCESS	HIGH DRIVING MODE SHARE	LONG COMMUTE TRAVEL TIMES	HIGH INJURIES
Metric Detail	Specific metric used is transportation costs as a percentage of household income. EPCs flagged as having high transportation costs are those that had census block groups with the highest deviations from the citywide mean percentage.	Specific metric used is elevated risk of developing cancer due to exhaust and pollution.	Specific metrics used were jobs accessible by a 45-minute transit trip and 30-minute automobile trip. EPCs flagged as having low jobs access are those in which job access is far more accessible by automobile than by transit.	Specific metric used is drive alone rates by origin district.	Specific metric used is average travel time by origin.	Specific metric used is bicycle and pedestrian collision data.
Original Source Data	"2020 Transportation," Esri and Bureau of Labor Statistics	San Francisco Citywide Health Risk Assessment: Technical Support Documentation, accessed at **www.sfdph.org/dph/files/EHSdocs/AirQuality/Air_Pollutant_Exposure_Zone_Technical_Documentation_2020.pdf**	ConnectSF Statement of Needs, 2015 base year analysis, accessed from **www.connectsf-jobsaccessibility.sfcta.org**	ConnectSF Statement of Needs, 2015 base year analysis	ConnectSF Statement of Needs, 2015 base year analysis, accessed from **connectsf-traveltime.sfcta.org**	Statewide Integrated Traffic Records System (SWITRS) accessed at **safety.sfcta.org**

DETERMINING KEY NEEDS FOR TREASURE ISLAND AND THE RICHMOND DISTRICT EPCS

The Equity Assessment Report analysis used EPC definitions from 2017 which did not include the Richmond District EPC. The Richmond District EPC was added during an update of the EPC map in 2021. In addition, the Equity Assessment Report does not identify Treasure Island as a separate EPC because it is part of the SoMa EPC. For the purposes of the SFTP, staff reviewed past data sources to identify key needs for these EPCs neighborhoods.

Richmond

Based on data available in the 2022 Transportation Expenditure Plan Equity Assessment Report, staff identified Low Jobs Access, High Driving Mode Share, and Long Commute Travel Times as transportation needs for the Richmond district EPC.

Treasure Island

Based on data available in the 2022 Transportation Expenditure Plan Equity Assessment Report and other existing data sets from past studies, staff identified Excess Pollution, Low Job Access, and Long Commute Travel Times as transportation needs for Treasure

Island. Drive Alone rates specifically for Treasure Island are not available in the Equity Assessment Report and the original ConnectSF data source because the data for Treasure Island is combined with South of Market. Staff used the **Treasure Island Demand Model Analysis Report For years 2025, 2030, and 2035** as an alternative data source. The 2025 model run in this report estimates that 65% of trips on and off the island would be by auto (combined drive alone and carpool). For this reason, staff included High Driving Mode Share as a key equity metric for Treasure Island.

SFTP 2050: APPENDIX E

Public Outreach Summary

1. Executive Summary

The San Francisco Transportation Plan (SFTP) is the 30-year long-range investment plan for the City of San Francisco. The plan prioritizes project and program investments and is informed by existing city and regional plans such as ConnectSF, San Francisco's Climate Action Plan, and Plan Bay Area 2050. SFTP builds on these plans to identify investment opportunities for multimodal transportation projects and programs. To inform the planning process, the San Francisco Transportation Authority (SFCTA) engaged with communities, with a focus on Equity Priority Communities (EPCs), to gather input on their priorities for transportation investments.

The team used a combination of three outreach methods to connect with the community:

- an online, multilingual survey,
- community presentations, and
- a public Town Hall.

To promote participation in the planning process, the team contacted community groups cross the city, including groups representing Equity Priority Communities (EPCs), partnered with community-based organizations (CBOs) to hold meetings and promote the survey, ran multilingual Facebook ads, worked with the SFCTA Board and Community Advisory Committee to promote the survey, and highlighted the SFTP on the SFCTA website, in the eNewsletter, and in emails to past outreach participants.

Using these outreach methods, the team collected 533 survey responses, gave presentations to 13 CBOs, and hosted one public Town Hall. Key findings that emerged from outreach include the following:

- Transit investments are a clear priority for participants; many highlighted their preference to prioritize transit service expansion, increase reliability, and restore service to previous levels and previously existing lines.
- Equity and affordability are a key concern amongst participants, many of whom mentioned they would like to see improved affordability across all modes to reduce barriers for low-income residents.
- Although not the highest priority for funding, many participants mentioned that they would like to see investments in safety and active transportation projects.

- Participants also mentioned that they would like to see new major rail projects and a more integrated transit system that connects to other transit systems across the region, such as BART and Caltrain.
- Perceived physical safety was a concern for many participants, noting that interventions such as pedestrian scale lighting and traffic enforcement would promote a greater sense of safety and encourage non-vehicular travel.
- Transformative freeway projects, while presented as an option in the survey, were found to be the lowest priority for many participants and stakeholders despite there being previous interest in freeway removals and other projects that reduce vehicle capacity.
- The importance of project delivery and accountability was also mentioned by stakeholders; they would like a more transparent approach to communicating project impact, potential mitigation efforts, and return on investment.

A second round out outreach was conducted in the Fall of 2022 to share findings from the previous round of outreach and the draft SFTP Investment and Vision Plan.

2. Introduction

The San Francisco Transportation Plan (SFTP) is long-range investment and policy plan for multimodal transportation projects, programs, and capital investments in the City of San Francisco over a 30-year horizon. The SFTP includes growth and revenue projections that are based on MTC's regional long-term forecasts developed through Plan Bay Area 2050 and draws from ConnectSF.

Outreach sought to gather input from the community to inform the SFTP's priorities for investing discretionary funding. Equity was the main consideration for the promotion of this planning process, with an emphasis on engaging directly with Equity Priority Communities (EPCs). The team developed a stakeholder list of community-based organizations (CBOs) that represented each San Francisco district and conducted as many in-language presentations as possible to these organizations. Community members were also able to share their input via an online survey and a public Town Hall. The following sections of this outreach summary include:

- Summary of Engagement Tools
- Summary of Publicity Tools
- Summary of Outreach Findings

3. Engagement Tools

Gathering feedback from every district in San Francisco was key to developing a Transportation Plan that reflects the priorities of San Francisco's diverse residents. The project team used a variety of tools and strategies to connect with residents across San Francisco. An emphasis was placed on gathering feedback from EPCs and monolingual, non-English-speaking San Francisco residents. The sections below elaborate on the engagement tools and strategies used for this project.

SURVEY

A multilingual, illustrated survey was the primary tool used to share information about the SFTP with members of the public and gather their feedback about investment priorities for both expected discretionary funds and potential revenue coming from new sources.

Knowing that San Francisco residents are busy, the SFCTA team developed a survey that included additional context upfront to quickly bring participants up to speed on previous work and provide context about the goals of the SFTP and funding sources. The background on previous work included a description of the ConnectSF Vision and community engagement findings. It also identified known investment priorities based on the ConnectSF Statement of Needs, Transit Strategy, and Streets and Freeways Strategy; these include maintaining transit and road assets, resilience and electrification, the Five-Minute Network, improvements to the express bus and regional network, renewing and modernizing the existing rail system, and additional rail to San Francisco's busiest places. Providing this baseline understanding of existing priorities allowed participants to provide more meaningful feedback to questions to the survey's questions.

The survey asked the following questions:

1. The SFTP will advance city priorities including safe streets, active transportation, and managing congestion. There is limited discretionary revenue that we have the flexibility to be put towards any of our priorities. In rank order, how would you prioritize spending this limited discretionary revenue?
    - O Focus on increased bus service: Increase transit service beyond what was provided before the pandemic
    - O Reducing the maintenance backlog: Improve reliability by reducing the number of vehicles that are out of service
    - O Focus on transit improvements and expansion: Expand the transit system with new stations and/or transit lines, and improve existing stops and stations
    - O Invest in a blend of all modes and priorities, rather than focusing on transit: Spread investments across walking, biking, safety and education programs, maintaining and managing the street and freeway network, and transit.

2. With potential new revenues we can advance the next generation of transportation. In rank order, what would you advance with potential new revenues?
   - O Transit investments to improve affordability, expand bus and Muni metro service, and reduce the maintenance backlog
   - O High-quality protected bike lanes across the city by increasing investments in the active transportation network to create
   - O Major freeway redesign projects to reconnect communities and create new land use opportunities
   - O New major rail projects to create better connections within San Francisco and the region
   - O Other.
3. Please share any additional ideas you have for what we should aim to achieve through our long-term investment strategy
4. The survey also collected demographic information about the survey respondents, including race and ethnicity, gender identify, annual household income, and home zip code.

The survey was featured prominently on the SFCTA website and information was shared on SFCTA social media platforms and via email with their extensive list of participants from previous phases of the project. The survey also was promoted to the public through a blogpost, email, and through CBO partnerships. The SFCTA team reached out to 45 community-based organizations. CBOs were offered a $300 stipend to post pre-written and illustrated social media posts in a variety of languages depending on the needs of their members. CBOs were encouraged to adapt the language as needed to better fit their social media voice. Of the 45 CBOs, 10 that represent key communities across the city shared information about the survey.

Some CBOs, particularly in Districts 4, 5, and 10, declined the stipend for promotion of the survey via their social media channels due to outreach fatigue amongst their members. They noted that there had been several recent requests from various San Francisco agencies to gather feedback from members, specifically related to long-range transportation planning. The project team acknowledged this challenge and conducted outreach to additional CBOs to promote the survey, particularly in EPCs.

Finally, to boost participation from Spanish and Chinese speakers, the team placed Facebook ads in Spanish and Traditional Chinese to target multilingual or monolingual Spanish and Chinese speakers. Ads were also run in the Richmond Review/Sunset Beacon, Wind Newspaper, San Francisco Bay View, and El Tecolote.

COMMUNITY PRESENTATIONS

The team hosted community presentations to bring together members of EPCs, provide them with more detail about the SFTP, and engage in conversation about their opinions on the survey questions. All presentations were hosted virtually via Zoom, utilizing a 15- to 45-minute presentation deck depending on time allotted. Organizations that accommodated standalone 45-minute-long presentations for their members were given $750 stipends. The SFCTA team reached out to a total of 45 CBOs, 13 of which agreed to accommodate the SFTP presentation. The team conducted three monolingual, non-English presentations: one in Spanish to La Raza Community Resource Center, and two in Cantonese to Community Youth Center of San Francisco and Self Help for the Elderly.

The team gave presentations to the following CBOs:

- Central City SRO
- Community Youth Center of San Francisco (CYC SF)
- Excelsior Action Group
- La Raza Community Resource Center
- North Beach Neighbors
- People of Parkside Sunset (POPS)
- Potrero Boosters and the Dogpatch Neighborhood Associations' joint Livable Streets Committee
- San Francisco Bicycle Coalition
- San Francisco Sierra Club Transportation Committee
- San Francisco Small Business Commission
- San Francisco Transit Riders
- Self Help for the Elderly
- SF Youth Commission

The team contacted the following CBOs, but they either did not respond or declined to participate:

- A. Philip Randolph Institute San Francisco (APRISF)
- American Indian Cultural District of San Francisco
- BAYCAT
- Bayview Merchants Association

- Bayview Opera House
- Catholic Charities
- Chinatown Community Development Center (CCDC)
- Coalition of San Francisco Neighborhoods
- Coleman Advocates for Family and Youth
- ConnectSF Futures Task Force
- El Centro Bayview
- Fillmore Merchant and Neighborhood Collaborative
- Fillmore Merchants Association
- Haight Ashbury Neighborhood Council
- Inner Sunset Park Neighbors
- Japantown Community Benefit District
- Japantown Task Force
- Marina Community Association
- Parents for Public Schools
- PODER
- Russian American Community Services
- San Francisco Council of District Merchants Associations
- San Francisco Human Rights Commission
- San Francisco Interfaith Council
- San Francisco Labor Council
- Senior and Disability Action
- SF Chamber of Commerce
- SoMa Pilipinas
- Sunset Neighborhood Beacon Center
- Visitacion Valley Community Center
- Walk SF
- Young Community Developers

GENERAL PUBLIC TOWN HALL

The SFTP Town Hall was an opportunity for community members to learn more about the SFTP and provide input on their priority investment categories. The Town Hall followed a similar format to the community presentations but was slightly longer and more detailed. It consisted of a presentation about existing work and investment categories followed by a conversational Question & Answer session during which participants were encouraged to share the "why" behind their investment priorities. During this event, the team asked identical questions to those asked in community presentations and in the survey. While community presentations were limited to members of the CBOs that co-hosted them with the SFCTA, the Town Hall was open to anyone who wanted to participate.

The Town Hall was publicized through the SFCTA website, eNewsletters, and social media, as well as through social media and eNewsletters of CBO partners. The Town Hall was conducted on the evening of Thursday, April 28, 2022, via Zoom to make it safe and accessible to as many people as possible. The meeting was conducted in English, Spanish, and Chinese (both Cantonese and Mandarin interpreters were available). Approximately 15 participants joined the meeting, all of whom were English speakers.

4. Publicity Tools

The SFCTA team deployed several publicity tools to encourage participation in the SFTP planning process and solicit feedback on investment priorities. Publicly tools used included:

A list of community stakeholders that focused on EPCs across the city. This list formed the foundation of the team's targeted outreach, with the aim of elevating perspectives that may not have historically been included in the planning process.

Community messengers. The SFCTA team offered stipends to CBOs in exchange for sharing posts on their social media platforms about the SFTP survey and Town Hall. Thirteen organizations shared messaging about SFTP engagement opportunities, although some declined the stipend. Organizations included:

- Central City SRO
- Community Youth Center of San Francisco (CYC SF)
- Excelsior Action Group
- La Raza Community Resource Center
- North Beach Neighbors
- People of Parkside Sunset (POPS)
- Potrero Boosters and the Dogpatch Neighborhood Associations' joint Livable Streets Committee
- San Francisco Bicycle Coalition
- San Francisco Sierra Club Transportation Committee
- San Francisco Small Business Commission
- San Francisco Transit Riders
- Self Help for the Elderly
- SF Youth Commission

Multilingual Facebook ads. To boost participation from Spanish and Chinese speakers, the team placed Facebook ads in Spanish and Traditional Chinese that linked to the project page and survey.

Partner messengers. SFCTA staff requested that members of the SFCTA Board and the SFCTA Community Advisory Committee share information about the survey and Town Hall on their social media platforms.

SFCTA website. Project information was hosted on the SFCTA website at SFCTA.org/SFTP. The page served as a clearinghouse for information about the project. It included background information on the SFTP development process presented in accessible language, detailed graphic representations of the SFTP Statements of Needs, links to past presentations, and other key resources. The website also linked to the multilingual survey and provided information about joining the digital Town Hall.

SFCTA eNewsletter and emails to past participants. The SFTP was featured prominently in the SFCTA eNewsletter. Additionally, the team sent emails promoting SFTP engagement opportunities directly to individuals who had participated in the development process, including ConnectSF, and indicated they would like to continue their participation. Finally, the team sent an email to all Futures Task Force members inviting them to participate in a special presentation and discussion with SFCTA staff.

Local Newspaper Ads. Ads promoting participation in the survey and Town Hall were run in the Richmond Review/Sunset Beacon, Wind Newspaper, San Francisco Bay View, and El Tecolote.

OUTREACH CHALLENGES

The team encountered the following challenges during outreach:

- **Outreach fatigue.** When reaching out to dozens of CBOs across the city to offer paid partnership opportunities (social media and presentations), the team heard repeatedly that CBOs had received several recent requests from various San Francisco agencies to gather feedback from members, specifically related to long-range transportation planning. Several organizations declined to participate as a result.
- **Ongoing Concerns about COVID Safety.** COVID-19 variants and ensuing surges made in-person outreach, at times, unsafe. However, the project team recognizes that for some communities in-person meetings are preferable to digital presentations. The team followed best practices for social distancing, as outlined by the CDC, and offered CBOs the option of in-person meetings when it was safe to do so.
- **Lack of participation from the Futures Task Force.** As noted above, all members of the Futures Task Force (FTF) were invited to participate in a special presentation and conversation with SFCTA staff. However, no members of the FTF attended the digital meeting. The team does not know why there was a lack of participation and can only speculate that the topic was not attractive, was not held at convenient time, or members of the FTF no longer wish to participate, or some combination of the above.

5. Summary of Key Findings

KEY TAKEAWAYS

Feedback shared by survey respondents and meeting participants highlighted six key themes. The themes were identified because they were mentioned by multiple stakeholders and community members via the survey and community meetings.

Theme 1: Transit Service Increases and Transit Reliability, and Expansion Improvements

- Transit service increase, reliability, expansion, and improvements were a high priority for most survey respondents and a large share of people who participated in the public presentation outreach sessions.
- Participants specifically mentioned that they would like to see increased and restored bus service that is more reliable and on-time.

Theme 2: Affordability and Equity

- Survey and public meeting participants stated they would like equity to be prioritized throughout the planning and implementation process.
- Affordability was also a key priority for participants, sharing they would like to see all modes made affordable, particularly for low-income travelers.

Theme 3: Active Transportation and Safety

- Participants stated that they would like to see safety and vision zero efforts receive greater funding to promote community health and active travel.
- Many participants mentioned they would like for the active transportation network to be expanded to promote mode shift and sustainable travel.
- Some participants highlighted the need for improved lighting and increasing enforcement on streets and transit to increase perceived safety.

Theme 4: New Rail for Local and Regional Trips

- Participants stated that they would like to see improved connections to the regional transit system, such as Caltrain and BART.
- Major rail projects were second highest priority for new revenue spending.

Theme 5: Project Delivery and Accountability

- Stakeholders emphasized the importance of project delivery and accountability. They would like a more transparent approach to communicating project impact, potential mitigation efforts, and return on investment.

Theme 6: Transformative Street and Freeway Projects

- Transformative street and freeway projects were found to be the lowest priority for many participants and stakeholders despite there being previous interest in freeway removals and other projects that reduce vehicle capacity.

SURVEY FINDINGS

The survey was available from April to May 2022 and collected a total of 533 total responses – 486 English, 38 Chinese, 8 Spanish, and 1 Russian. Survey responses highlighted the following key takeaways:

- Increased bus service is a top priority for discretionary revenue spending.
- Transit improvements and expansion is a top priority for discretionary revenue spending.
- Transit affordability is a top priority that community members would like to see advanced with new revenues.
- Major rail projects are the second highest priority that community members would like to see advanced with new revenues.
- In addition to the options provided in the survey, community members also shared that they would like to see stronger regional transit connections, safe and affordable active transportation options, and programs and policies to encourage mode shift.

The following sections provide more detailed findings related to the three survey questions.

Priorities for Discretionary Revenue Spending

- There is no clear top priority based on respondent input; an equal share of respondents ranked increased bus service and transit improvements and expansion as their top priority.
  - » 28% of respondents (150) said their top priority is to focus on increased bus service; 27% of respondents (145) cited this is their second priority.

- The highest number of people that ranked increased bus service as their first or second priority live in the following zip codes: 94109, 94110, 94112, 94114, 94116, 94117, and 94122; between 18 to 25 participants in these zip codes ranked this option as their first or second priority.
- The highest shares of people who ranked increased bus service as their first or second priority live in the following zip codes: 94014, 94102, 94109, 94117, and 94121; between 61% to 73% of participants in these zip codes ranked this option as their first or second priority.
- Figure 1 shows the number and share of people by zip code that ranked increased bus service as their first or second priority.

» 28% of respondents (148) said their top priority is to focus on transit improvements and expansion; 26% of respondents (140) ranked this as their second priority.

- The highest number of people that ranked transit improvements and expansion as their first or second priority live in in the 94110, 94114, and 94122 zip codes; between 20 to 25 participants in these zip codes ranked this option as their first or second priority.
- The highest shares of respondents who ranked prioritizing transit improvements and expansion as their first or second priority live in the following zip codes: 94105, 94107, 94118, 94124, 94134; between 71% to 83% of participants in these zip codes ranked this option as their first or second priority.
- Figure 2 shows the number and share of people by zip code that ranked transit improvements and expansion as their first or second priority.

• 24% of respondents (128) said their top priority is to focus on reducing the maintenance backlog; this is not far behind the other two priorities mentioned above.

• The lowest priority for survey participants is investment in a blend of all modes and priorities; only 16% of respondents (85) ranked this as their first priority, while 52% of respondents (276) ranked this either last or not at all.

Figure 1: Respondents Who Ranked Increased Bus Service as Their First or Second Choice, by Zip Code

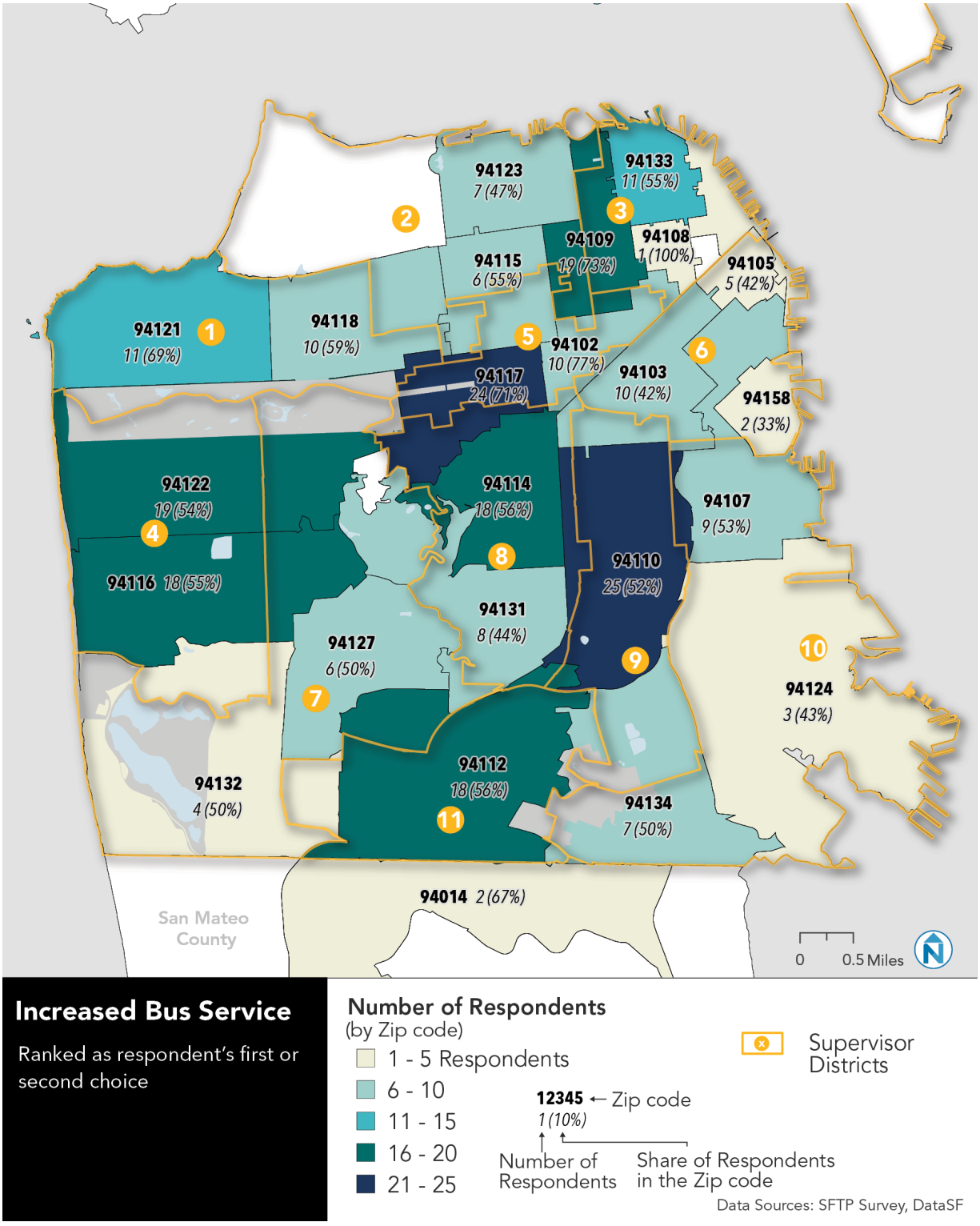
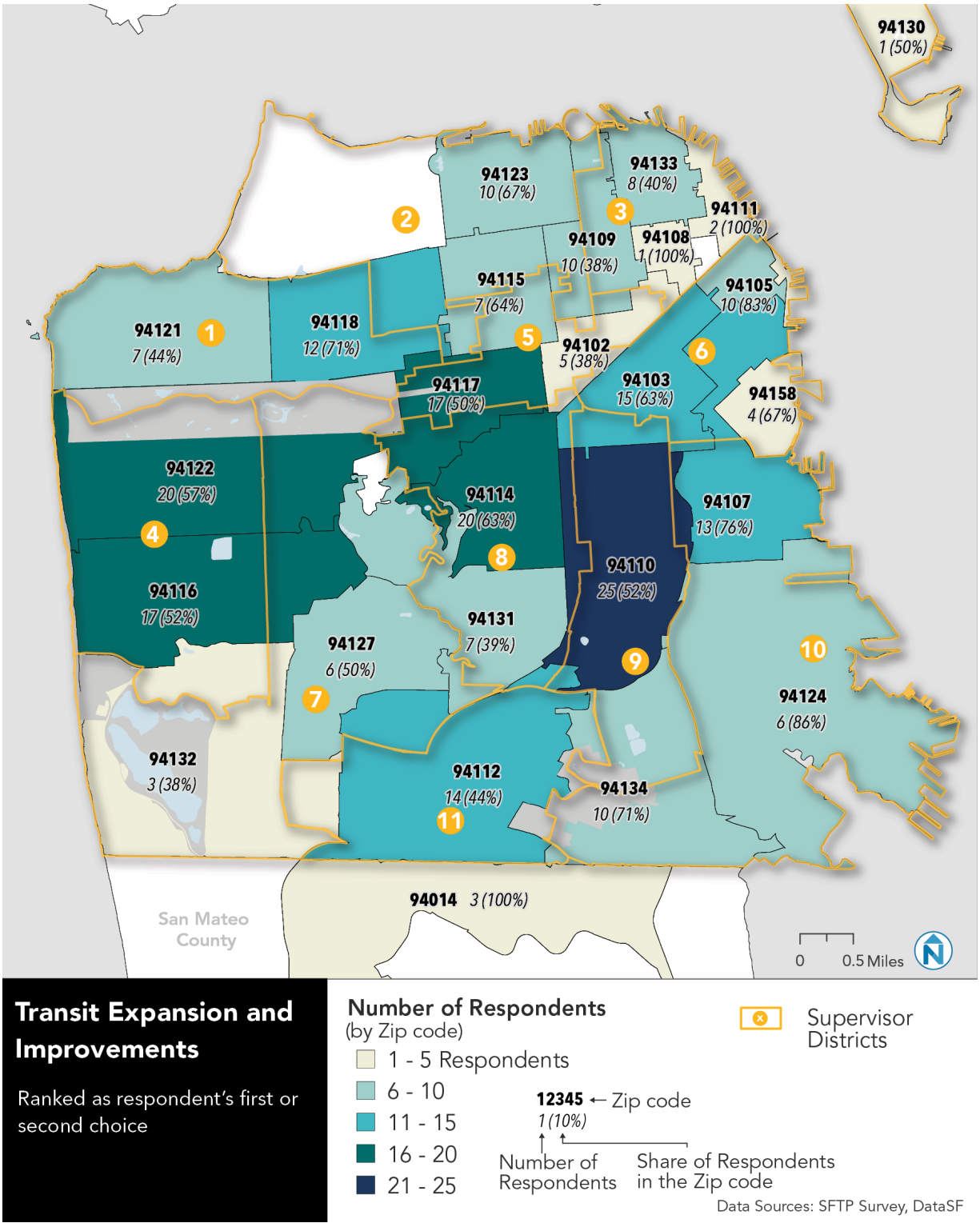


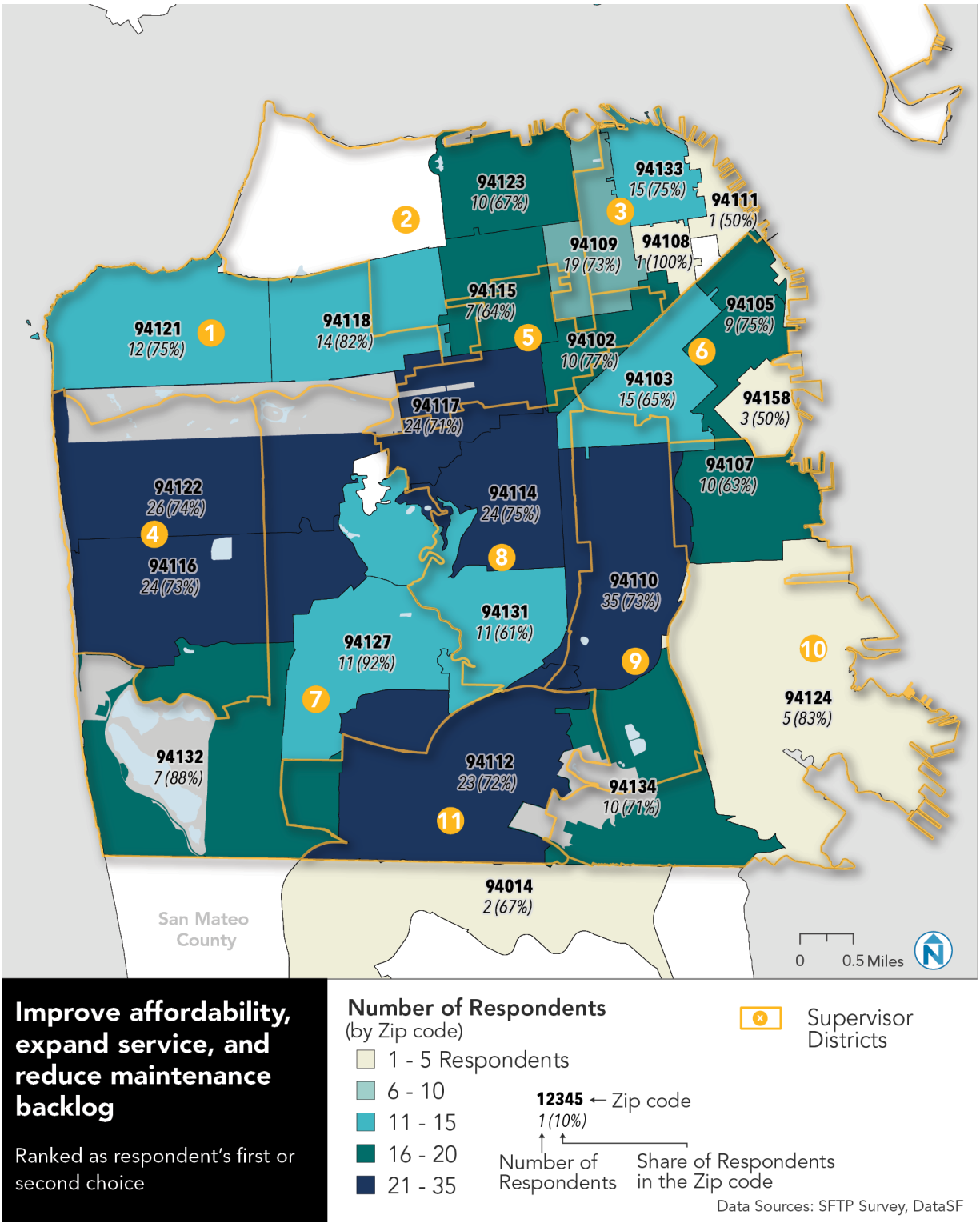
Figure 2: Respondents Who Ranked Transit Expansion and Improvements as Their First or Second Choice, by Zip Code



Priorities for Potential New Revenues

- The top priority of respondents is to improve affordability, expand service, and reduce maintenance backlog; 40% of respondents (212) said this is their top priority and 70% of respondents (373) ranked this as their first or second priority.
  - » The highest number of respondents who ranked improve affordability, expand service, and reduce maintenance backlog as their first or second priority live in the following zip codes: 94109, 94110, 94112, 94114, 94116, 94117, 94122.
  - » While many zip codes had a high share of support, the highest share of respondents who ranked improve affordability, expand service, and reduce maintenance backlog as their first or second priority live in the following zip codes: 94102, 94118, 94121, 94127, 94132; between 77% and 92% of participants in these zip codes ranked this option as their first or second priority.
  - » Figure 3 shows the number and share of people by zip code that ranked affordability, expand service, and reduce maintenance backlog as their first or second priority.
- The second priority of respondents is new major rail projects; 27% of respondents (142) said this is their top priority and 56% of respondents (300) ranked this as their first or second priority.
- 18% of respondents (96) ranked high-quality protected bike lanes as their top priority; generally, this option does not stand out as a top priority or the lowest priority.
- The lowest priority of respondents is major freeway redesign projects; 55% of respondents (293) ranked this their lowest priority or did not rank it at all, and only 8% of respondents (44) ranked this as their top priority.

Figure 3: Respondents Who Ranked Improve Affordability, Expand Service, and Reduce Maintenance Backlog as Their First or Second Choice, by Zip Code



Other Ideas the Long-Term Investment Strategy Should Focus On

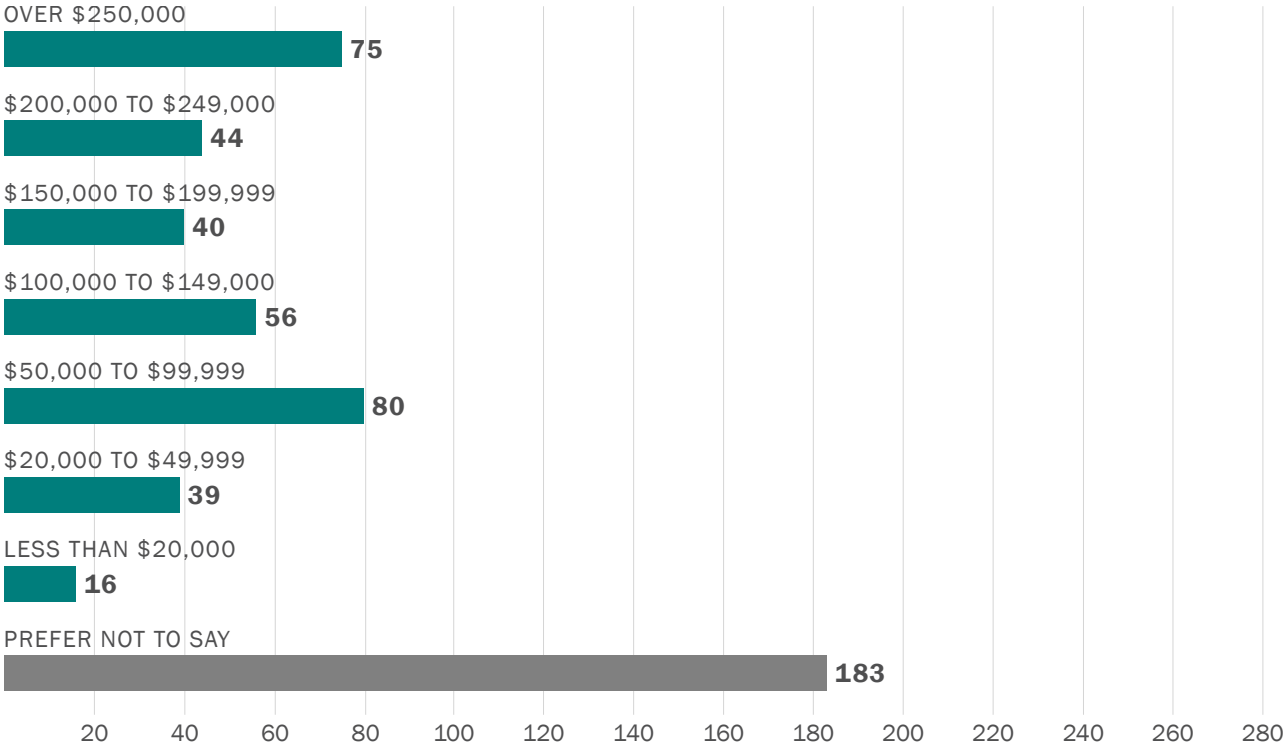
The following key themes emerged from the third, open-ended survey question:

- Many respondents shared that…
  - » Transit affordability and access is a key priority, particularly for low-income communities, people with disabilities, and older adults.
  - » A larger, more connected, and efficient transit system is a priority for them.
  - » Their priority is improving safety and walkability throughout the city.
  - » Expanding bikeshare and making it more affordable to low-income families is a priority.
  - » Increasing car-free programming to promote safe pedestrian and bicycle travel is a priority.
- Car free programs are perceived to add congestion and are a concern for residents. Some respondents shared that…
  - » They would like to see increased availability of electric vehicle (EV) charging stations and subsidies to make EVs more affordable.
  - » The implementation of Congestion Pricing in the downtown area to make transit more efficient and decrease congestion and the related environmental impacts is a priority.
  - » They would like to see stronger enforcement of bus-only lanes and bike lanes to ensure compliance, increase safety, and improve mobility.
  - » They would like to see increased parking supply and affordability, particularly near transit to encourage transit access and ridership.
  - » They would like to see greater integration with other transit systems in the region and expansion of rail services into more parts of San Francisco.
- Just a few respondents expressed…
  - » The desire for full removal of existing freeways to reduce vehicle travel and to meet long-term climate goals.

Who Responded to the Survey

The following section provides an overview of the demographics of survey respondents where available.[1] Of the respondents who provided their annual household income, the highest represented income categories were $250,000 or higher and $50,000 to $99,999 (75 and 80 total respondents respectively) (Figure 4). Most respondents (299) live in households of just one or two people (Figure 5). Most respondents were White non-Hispanic (248), followed by Asian non-Hispanic (73). Black survey respondents were underrepresented, with just six respondents (Figure 6). Nearly 50% of respondents identified as men, one-third identified as women, and 2% identified as non-binary (Figure 7). They survey reached people across the city, with a strong representation from residents who live in zip codes located in Supervisor Districts 4, 7, 8, 9, 11 (Figure 8).

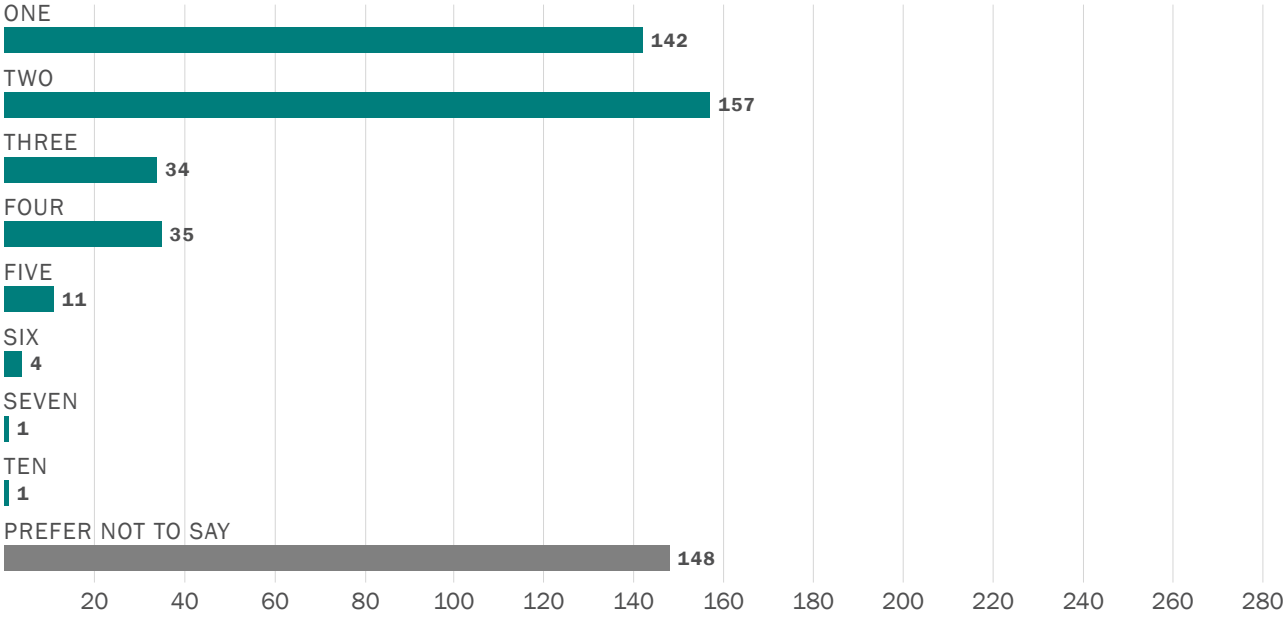
Figure 4: Annual Household Income (N=533)



Note: Respondents who did not respond to this question were grouped into the "Prefer not the say" category.

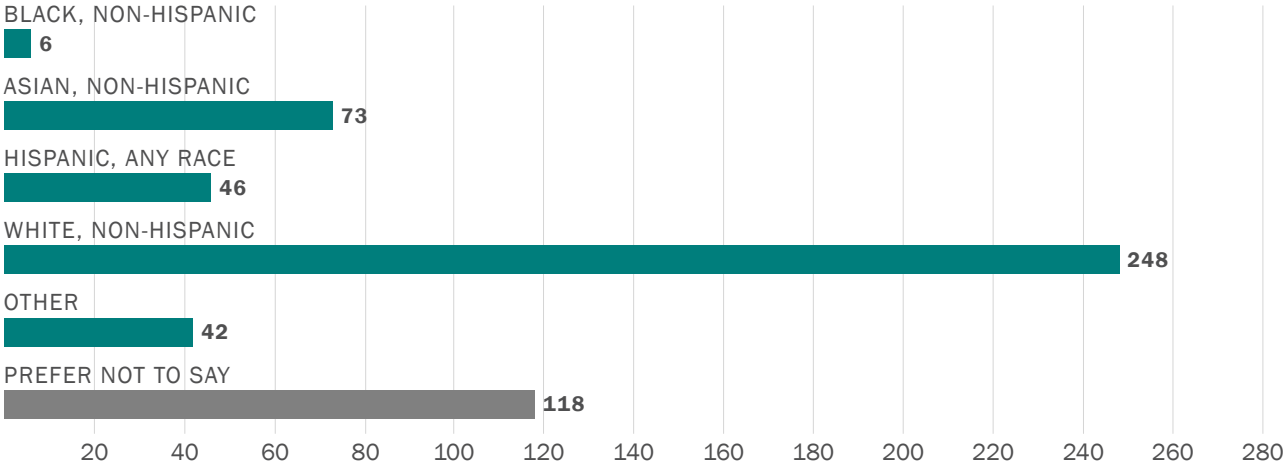
1 Many participants opted out of sharing demographic information.

Figure 5: Household Size (N=533)



Note: Respondents who did not respond to this question were grouped into the "Prefer not the say" category

Figure 6: Race/Ethnicity (N=533)

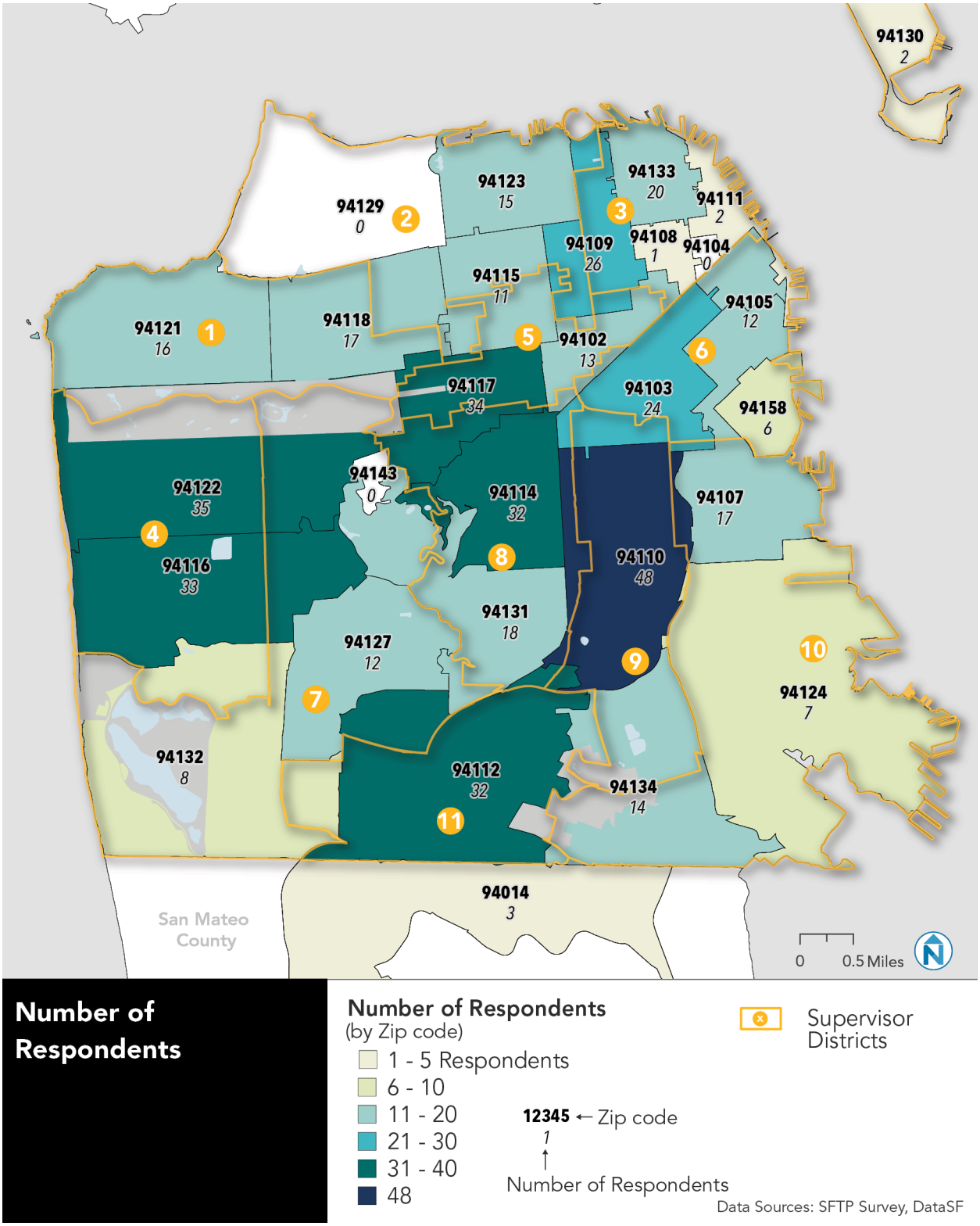


Note: Respondents who did not respond to this question were grouped into the "Prefer not the say" category

Figure 7: Gender (N=533)

Note: Respondents who did not respond to this question were grouped into the "Prefer not the say" category

Figure 8: Zip Code (N=463)



COMMUNITY PRESENTATION FINDINGS

As part of the outreach process, the team gave several community presentations. Table 1 provides an overview of the meetings, including the meeting dates and number of participants. Key themes discussed during these conversations included:

- Considerations for equity and environmental justice.
- The importance of safety and vision zero to promote active travel.
- Increased frequency of transit and resuming of transit service.
- Making streets and transit safer for riders and road users.

Table 1: Community Presentations

MEETING DATE	ORGANIZATION
3/28/2022	Small Business Commission
4/4/2022	Self Help for the Elderly
4/6/2022	San Francisco Transit Riders Union
4/14/2022	North Beach Neighbors Complete Streets Committee
4/15/2022	CYCSF
4/19/2022	Excelsior Action Group
4/20/2022	Future Task Force*
4/21/2022	San Francisco Transit Riders Funding Working Group
4/25/2022	La Raza Presentation
4/28/2022	Central City SRO
4/28/2022	SFTP Virtual Town Hall
5/3/2022	Sierra Club Transportation Committee Presentation
5/5/2022	People of Park Side Sunset
5/6/2022	Potrero Boosters and Dogpatch Neighborhood of Associations' joint Livable Streets Committee
5/9/2022	SF Bicycle Coalition

* Zero participants attended the Future Task Force meeting on 4/20/2022

The following section summarizes the feedback shared during each presentation.

Small Business Commission

- The commission expressed that it is important to make sure the public has input on the plans and to ensure equity is part of the process and final plan.
- There was concern about the impacts of construction projects and a desire to explore potential mitigation efforts.
- The commission expressed that there should be a greater understanding about the return on investment of the projects the SFCTA is seeking input on.

Self Help for the Elderly

- This engagement session did not have any key takeaways. The time was spent informing the participants on how they can access the survey.

San Francisco Transit Riders

- The Transit Riders Union noted that the Transportation Authority should seek input from environmental justice organizations.

North Beach Neighbors Complete Streets Committee

- Multiple members of the committee mentioned that there should be more investment in Vision Zero to prioritize pedestrians and not vehicles – members specifically called out treatments like speedbumps, raised crosswalks, and daylit intersections.
- Multiple members mentioned they would like to see more investments in active transportation and transit while discouraging vehicle travel (for everyone except older adults and people with disabilities).
- Some members said they would like stronger rail connection to the rest of the region.
- Multiple members mentioned they would like the 15 Muni line to return to service.

CYCSF

- Participants discussed that they would like increased bus service that is frequent and on-time.
- Participants also would like to see better connections between transit lines.

Excelsior Action Group

- Action group members mentioned they would like to see more pedestrian safety investments such as pedestrian-scale lighting.
- Members would like to see investments across all modes and improved connectivity across modes.
- Members also mentioned they would like Muni service to be expanded and more affordable.

San Francisco Transit Riders Funding Working Group

- Working group members said that transit improvements should be prioritized, specifically increased bus service, reducing maintenance backlog, and regional expansion.
- The working group also discussed improving transit affordability.

La Raza Presentation

- Participants discussed the importance of making infrastructure safer through repairs such as potholes.
- Participants shared concerns about bus bunching and safety on transit, siting poor driving and lack of security.
- Better transit options were mentioned by participants, such as the addition of high-speed rail, more express busses, and BRT.
- Participants also discussed having transportation targeted towards unhoused people.

Central City SRO

- Residents shared that the investment plan should prioritize focusing on increased bus service and reducing maintenance backlog.
- Residents shared other considerations, including universal fare-free Muni and limiting private vehicle access in larger portions of the city.

SF Youth Commission

- The commission stated that the priorities should be to increase bus service, capacity, and affordability.
- The commission also called for expansion of rail projects and better connection to Amtrak and other regional services.
- The commission recently passed a resolution calling for free Muni for people up to 25 years old.

Sierra Club Transportation Committee

- The committee shared that their priorities are increasing transit service and affordability.
- The committee also shared their support for freeway redesign projects the reconnect communities.

People of Park Side Sunset

- Participants pointed out that the Sunset/Richmond does not have access to BART and suffers from congestion.

Potrero Boosters and Dogpatch Neighborhood of Associations joint Livable Streets Committee

- The committee was largely concerned with active transportation and safety while reducing private vehicle trips.
- The committee shared that they want transit to operate safely and reliably.

SF Bicycle Coalition

- The coalition shared that their priority is to keep Muni fares low.

GENERAL PUBLIC TOWN HALL FINDINGS

On April 28, 2022, the Transportation Authority hosted a virtual Town Hall to collect feedback on funding priorities for the SFTP; 15 people attended. To guide conversation, the team used the same questions as the online survey. Respondents were asked to rank their first through fourth choice priorities for spending discretionary revenue and what they would like to advance with potential new revenues. Respondents were also able to provide additional comments that were not given as options through the two questions.

Priorities for Discretionary Revenue Spending

- 40% of respondents (6) said that their first choice is increased bus service.
- 40% of respondents (6) stated their first choice is reducing maintenance backlog.
- 20% of respondents (3) said that they would prefer a blend of all modes.
- Transit expansion was the highest ranked second choice with 40% of respondents (6) choosing this option.
- Additional responses included fare free transit and fare subsidies, mandating accessibility and equity by design, and investing in programs and projects that support mode shift.

Priorities for Potential New Revenues

- 47% of respondents (7) selected Muni affordability and expansion of transit service and reliability as their first choice, while 27% of respondents (4) chose it as their second choice.
- 13% of respondents (2) selected high quality bike lanes across the city as their first choice, while 27% of respondents (4) chose it as their second choice.
- 13% of respondents (2) chose major freeway redesign projects as their first choice, while 7% (1) chose it as their second choice.
- 7% of respondents (1) said that new major rail projects are their top priority, while 20% chose it as their second priority.
- 40% of respondents (6) chose high quality protected bike lanes as their third choice.
- Other topics mentioned by participants included addressing ADA access through Universal Design, increasing safety through infrastructure and enforcement on transit, and increasing input opportunities and transparency for large projects and plans.

6. Second Outreach Round

The final element of the SFTP outreach effort involved sharing ways that engagement had shaped the SFTP with community members, particularly those who had taken time to provide feedback on the plan.

The team used three primary methods to connect with the community:

- email updates to past participants in the engagement process,
- presentations to community groups, and
- a public Virtual Town Hall.

To publicize these engagement methods, the team emailed 89 community-based organizations, used the agency's social media channels, and placed ads in print and/or digital versions of nine local newspapers.

EMAIL UPDATES + COMMUNITY PRESENTATIONS

The SFCTA team reached out to a total of 89 CBOs to let them know that there would be a multilingual digital Town Hall held on October 6, 2022 and to offer short presentation, using the same material, to their organization at a standing meeting, if desired. Four organizations requested presentations (North Beach Neighbors, Parents of Public Schools, Potrero Boosters and the Dogpatch Neighborhood Associations' Joint Livable Streets Committee, and the West of Twin Peaks Central Council). The Sierra Club direct their members to the digital town hall.

NEWSPAPER ADS

Advertisements were placed in the following monthly papers in late September:

- El Tecolote (with note about language assistance in Spanish)
- Potrero View
- Richmond Review
- San Francisco Bay View
- Sunset Beacon
- Marina Times

Sing Tao, a local daily Chinese-language paper ran an ad for the Town Hall on Sunday, September 25.

The following papers hosted digital ads for the Town Hall, starting in late September and running through October 6:

- Noe Valley Voice
- West Portal Monthly

TOWN HALL

A multilingual, digital town hall was held on the evening of Thursday, October 6, 2022. Monolingual Cantonese and Spanish breakout rooms were made available. It was attended by 11 participants, including one Cantonese speaker.

Most of the attendees were very familiar with the SFTP draft and had specific questions related to various revenue sources and budget issues. Comment themes included:

- Understanding future transit service and funding
- Emphasizing the need to restore transit service to pre-pandemic (2019) levels.
- Understanding funding sources, unmet needs, and how the SFTP would be put into action.
- Concern about congestion on city streets and how Congestion Pricing and Transportation Demand Management fit into the SFTP.

[this page intentionally left blank]

SFTP 2050: APPENDIX F

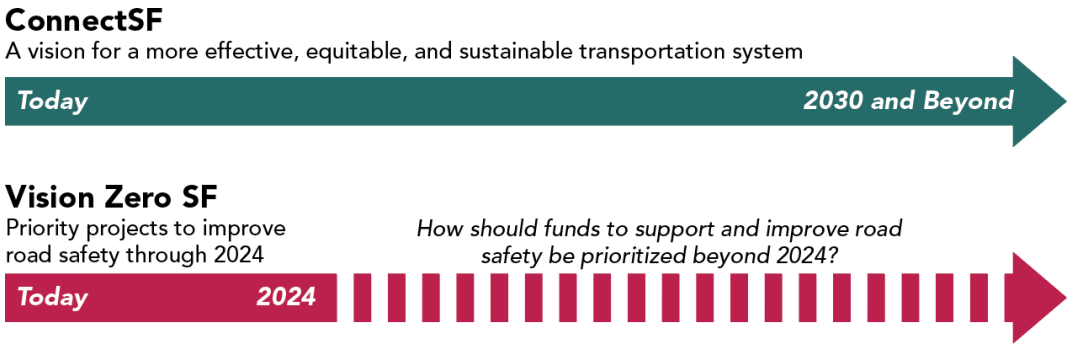
Streets and Freeways Survey Safety Preferences Findings

Executive Summary

ConnectSF is a long-term plan for creating a more effective, equitable, and sustainable transportation system for San Francisco over the next 50 years. The **Streets and Freeways Strategy** is one element of the ConnectSF effort. It recommends a series of concepts for further study and implementation which address transportation challenges and advance ConnectSF goals. The Strategy includes a set of concepts that address safety and active transportation on major roads and freeways, supporting San Francisco's **Vision Zero** policy.

The Vision Zero policy sets a goal to eliminate traffic fatalities by 2024. The Vision Zero program has been used to implement quick-build projects in areas with known safety challenges, resulting in safety improvements across much of the city's **High Injury Network**. More is needed to reach the goal of eliminating traffic fatalities. Community engagement from the Streets and Freeways Strategy and **SFTP 2050** can provide guidance for Vision Zero safety efforts and priorities beyond 2024. The alignment between ConnectSF and Vision Zero SF is illustrated in Figure 1.

Figure 1: ConnectSF and Vision Zero Alignment



The Streets and Freeways Strategy surveyed San Franciscans to understand support and priorities for different road safety strategies. Results showed that preferences for street safety interventions vary across the city. Paired with technical analyses and additional community engagement, the Streets and Freeways Strategy outreach findings can be used to identify and implement safety improvements that reflect community transportation needs. The results documented here reveal trends that should inform additional community engagement and strategy development. These trends should also inform future Vision Zero efforts.

KEY TAKEAWAYS

- Survey responses demonstrate that preferences for road safety improvements and strategies vary geographically.
- Reward- or incentive-based strategies that encourage transit and carpooling appear to be popular citywide.
- Traffic calming strategies were widely supported. Citywide, 75% of respondents expressed support for traffic calming strategies to reduce cut-through traffic.
- Support for more bicycle infrastructure in western parts of the city was relatively low compared with other neighborhoods and other strategies.
- Many write-in suggestions focused on safety impacts related to enforcing traffic laws and the closure of the Great Highway to vehicles.

Survey Overview

In summer 2021, the San Francisco County Transportation Authority (SFCTA) launched the Streets and Freeways Strategy Survey to learn about preferences for the future of San Francisco's major streets and freeways. Street safety improvements were one area of focus in the survey effort and survey responses can be used to inform long-term planning for road safety. The purpose of this memorandum is to analyze responses to this survey related to street safety and to understand how preferences for different types of safety improvements vary by geography. Learnings from this survey can be used to inform future neighborhood planning efforts and outreach activities, which will be needed to identify community-based solutions.

The survey was administered online during July and August 2021. It was available in four languages (English, Chinese, Spanish, and Filipino). 663 responses were collected and analyzed. The geographic distribution of these survey responses is shown in Table 1 and Figure 2.

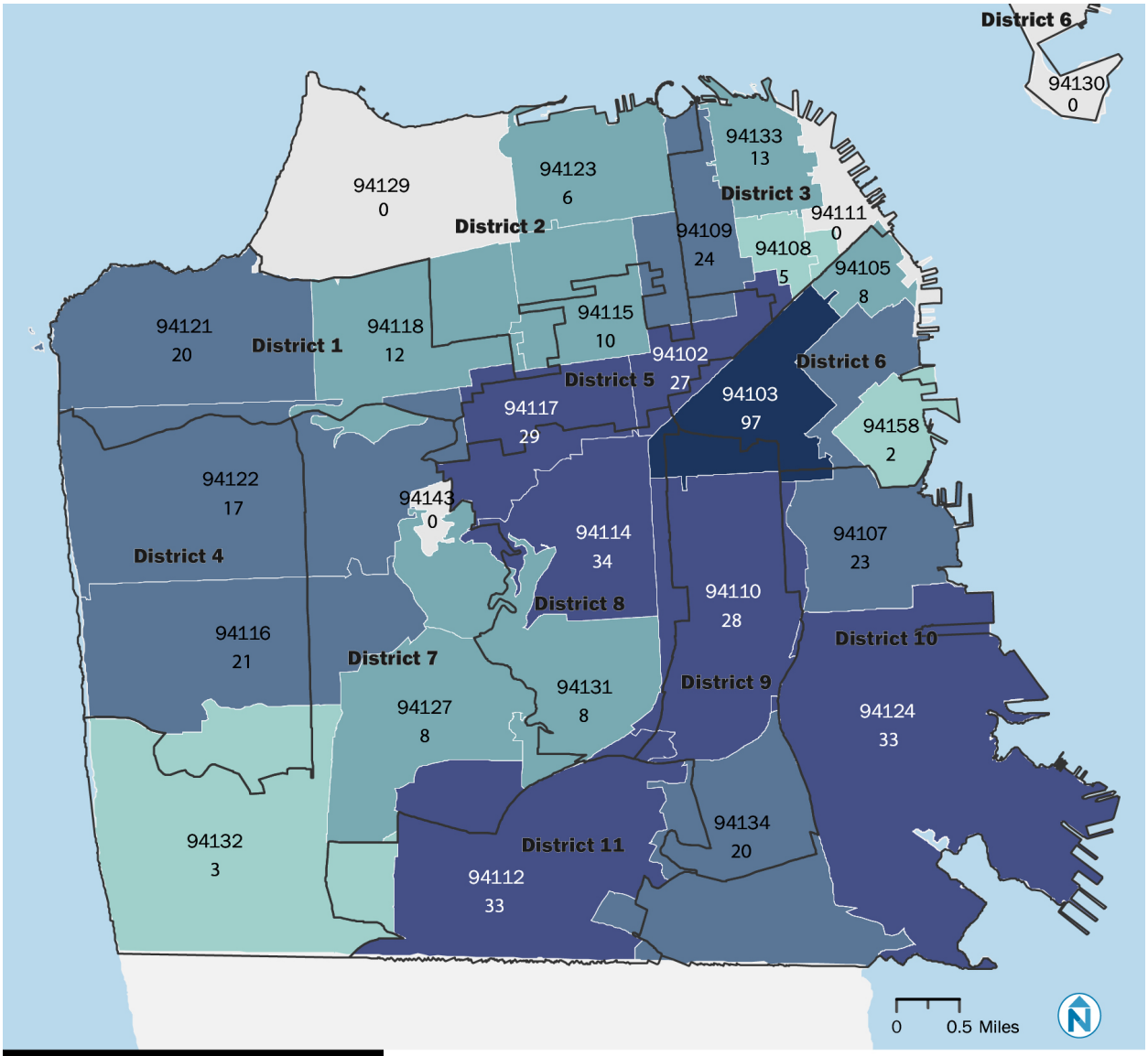
Response rates were highest in neighborhoods adjacent to Market Street and in neighborhoods near I-280 and US-101. Zip code 94103 had the highest response rate with 97 responses (14.5% of all survey responses). Responses rates were lower in neighborhoods in the southwest, north, and northeast.

Table 1: Total Survey Responses by Zip Code

ZIP CODE	NUMBER OF RESPONSES	ZIP CODE	NUMBER OF RESPONSES	ZIP CODE	NUMBER OF RESPONSES
94103	97	94118	12	94066	1
94114	34	94115	10	94402	1
94112	33	94105	8	94519	1
94124	33	94127	8	94523	1
94117	29	94131	8	94530	1
94110	28	94123	6	94611	1
94102	27	94108	5	94612	1
94109	24	94104	5	94618	1
94107	23	94132	3	94703	1
94116	21	94014	2	Other *	162
94121	20	94158	2		
94134	20	94609	2		
94122	17	94010	1		
94133	13	94015	1		

*"Other" includes all responses from zip codes outside of San Francisco and all responses that did not provide a zip code.

Figure 2: Total Number of Responses by Zip Code



Out of 657 total survey responses received, 501 provided a home zip code.

Overview of Findings from Survey Question 1

Question Text: Which of the following efforts best supports the strategies to dedicate space for efficient travel options like transit, biking, and walking?

Response Options: (select as many options as desired)

- ☐ Provide rewards and discounts for using transit
- ☐ Provide rewards for carpooling
- ☐ Provide discounts on bike and electric-bike purchases for those with low-incomes
- ☐ Install traffic calming on local streets to minimize cut-through traffic
- ☐ Manage curbs to reduce double parking, especially in bike and transit lanes
- ☐ Increase the availability of bike and scooter share
- ☐ Increase bike friendly amenities at transit stations, such as secure bike parking
- ☐ Other. Are there other strategies we should consider?

TRENDS AND OBSERVATIONS

Question 1 responses are summarized by strategy and by zip code in Figure 3, Figure 4, and Table 2.

Rewards and discounts

Providing rewards and discounts for transit, rewards for carpooling, and discounts on bike purchase (options 1, 2 and 3), received the widest geographic support. Only one zip code (94104) that had more than one survey response did not indicate support for any of these reward-based strategies. Combined support for these three reward or incentive-based strategies accounted for 37% of all strategies for which respondents indicated support. Among these three reward-based strategies, rewards for using transit received the strongest support (72%).

Bike and scooter share expansion

Support for bike and scooter expansion varied by location. Overall, 26% of respondents indicated support for increasing the availability of bike and scooter share. Support was highest in the Marina District/Cow Hollow and in Nob Hill (zip codes 94123 and 94108). Support was lower than average in some downtown neighborhoods along Market Street (12% in zip code 94102 and 18% in zip code 94103) with a high number of survey response rates.

Curb management

Managing the curb to reduce double-parking, especially in bike and transit lanes, received similar levels of support across all zip codes (17%). Support in central zip codes 94110, 94114, 94117 was slightly above average (22 – 25%).

Traffic calming

Traffic calming improvements to minimize cut-through traffic received support from 75% of survey respondents. Compared with other neighborhoods, respondents from zip code 94116 (Sunset) indicated lower support for traffic calming improvements. Some write-in responses from this zip code and other western zip codes advocated for strategies to address cut-through traffic on local streets near the Great Highway.

Other Strategies

126 respondents submitted an additional strategy for consideration. These write-in responses highlighted a range of perspectives and themes. Many respondents advocated for strategies that would de-prioritize single-occupancy vehicle use, including parking removal, congestion pricing fees, and designated car-free zones. However, many respondents also expressed a desire for strategies that prioritize drivers.

While modal preferences differed among respondents, some write-in themes cut across all modes. Respondents emphasized the importance of adequately addressing the needs of people of all ages and abilities in safety strategies. Many respondents highlighted the importance of complementing any design intervention with more extensive and effective enforcement.

Figure 3: Total Responses to the Survey Question "Which of the following efforts best supports the strategies to dedicate space for efficient travel options like transit, biking, and walking?"

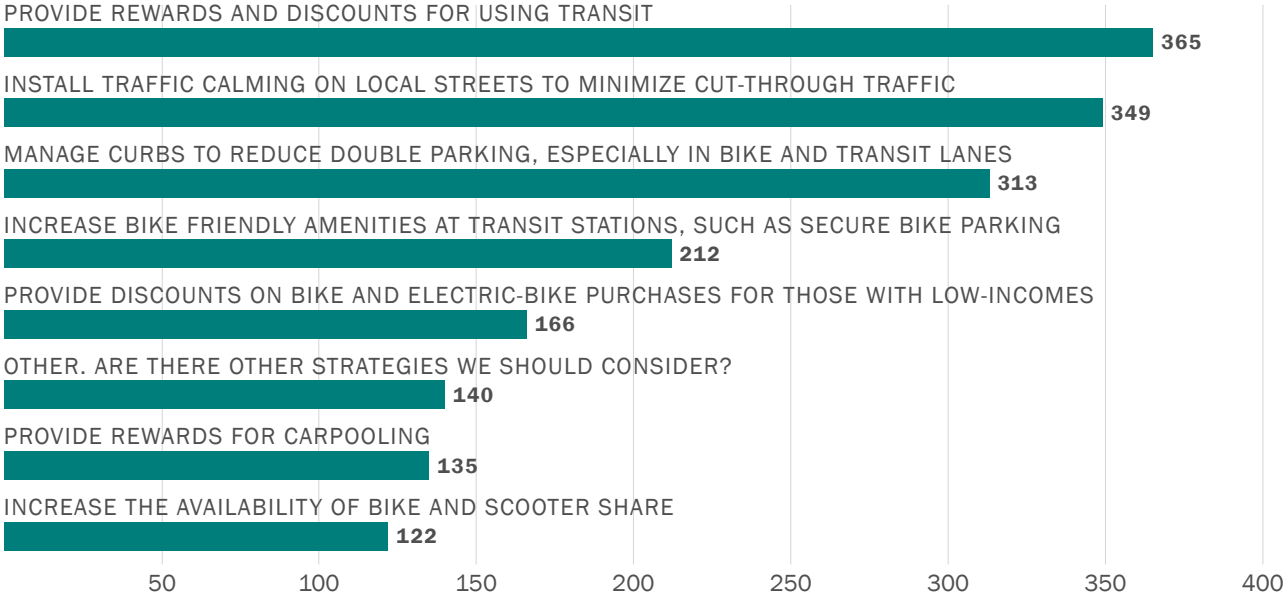
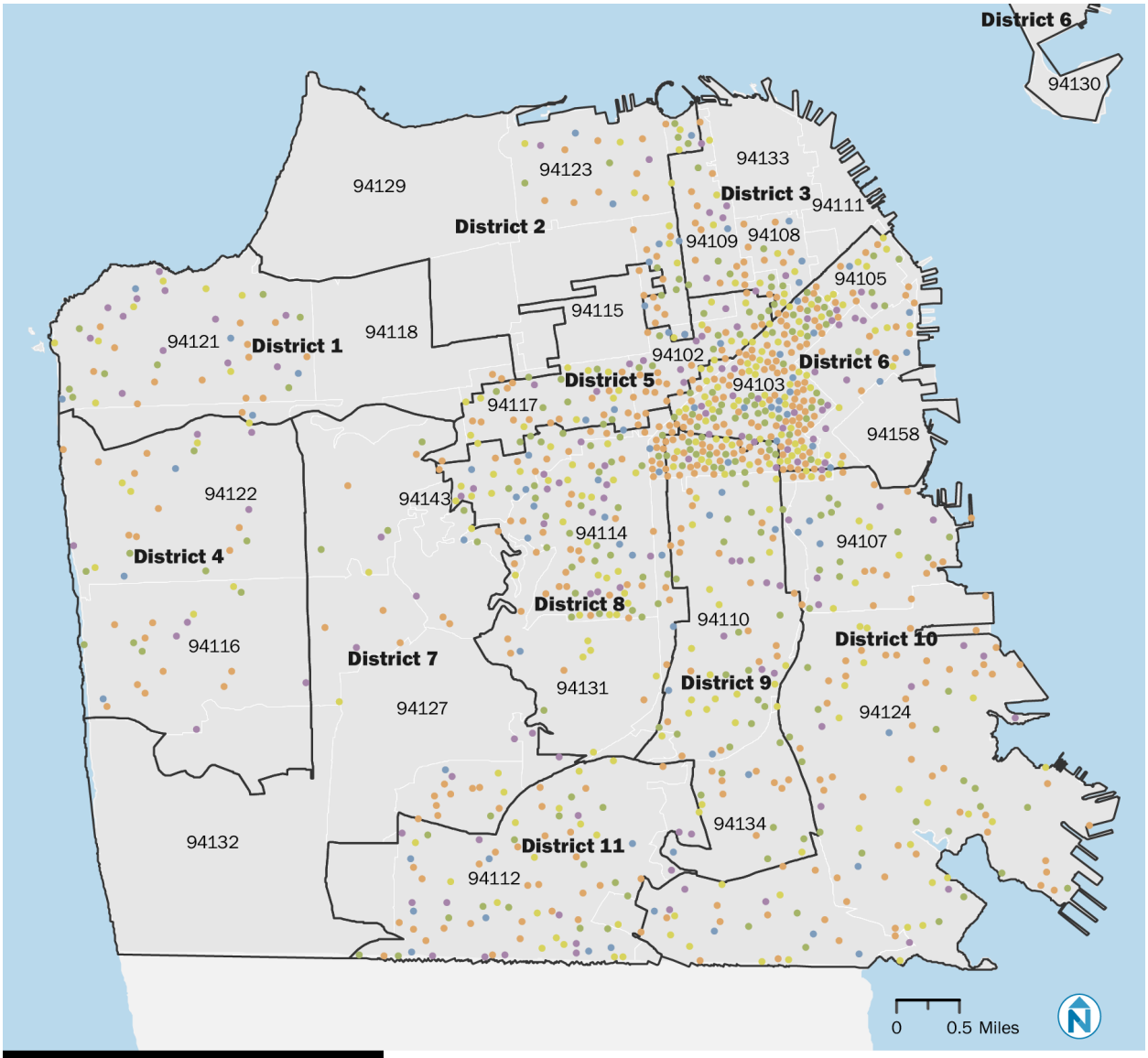


Table 2: Strategy Support and Response Rate by Zip Code

ZIP CODE	TOTAL RESPONSES	REWARDS AND DISCOUNT FOR USING TRANSIT, CARPOOLING, BIKE AND ELECTRIC-BIKE PURCHASES FOR THOSE WITH LOW-INCOMES.*	INSTALL TRAFFIC CALMING ON LOCAL STREETS TO MINIMIZE CUT-THROUGH TRAFFIC	MANAGE CURBS TO REDUCE DOUBLE PARKING, ESPECIALLY IN BIKE AND TRANSIT LANES	INCREASE THE AVAILABILITY OF BIKE AND SCOOTER SHARE	INCREASE BIKE FRIENDLY AMENITIES AT TRANSIT STATIONS, SUCH AS SECURE BIKE PARKING	OTHER
94103	97	124	61	53	17	22	6
94114	34	24	19	22	7	12	14
94112	33	37	19	16	9	12	1
94124	33	43	19	18	2	7	1
94117	29	22	19	14	7	5	13
94110	28	24	17	20	7	7	6
94102	27	29	12	14	3	9	8
94109	24	23	11	12	6	6	6
94107	23	20	11	12	6	11	7
94116	21	12	3	4	1	5	16
94121	20	13	8	8	4	12	7
94134	20	20	11	9	6	7	3
94122	17	13	6	8	3	5	6
94133	13	10	6	4	1	6	4
94118	12	8	5	5	0	4	6
94115	10	4	4	6	3	4	6
94105	8	10	5	4	1	3	1
94127	8	5	3	4	3	3	4
94131	8	7	5	2	1	4	3
94123	6	8	3	2	2	2	1
94108	5	6	2	1	3	2	0
94104	5	5	4	3	1	2	0
94132	3	3	1	2	0	1	2
94014	2	0	2	2	0	1	1
94158	2	2	2	1	0	0	1
94609	2	1	1	1	2	1	0
94010	1	1	0	0	0	1	1
94015	1	1	0	1	1	0	0
94066	1	1	1	0	0	1	0
94402	1	0	1	0	1	1	0
94519	1	2	1	0	0	0	0
94523	1	0	1	0	1	1	0
94530	1	2	0	0	0	0	1
94611	1	1	1	1	0	0	0
94612	1	1	1	0	0	0	1
94618	1	0	1	1	0	1	0
94703	1	1	0	0	1	1	0
Other*	162	174	80	60	23	50	14

***Note:** this summary table combines responses for all three reward or incentive-based strategy options into one category – as a result, some totals for this category are greater than the total number of responses.

Figure 4: Question 1 Responses by Zip Code



Q1. Which of the following efforts best supports the strategies to dedicate space for efficient travel options like transit, biking, and walking?

- Rewards and discounts: Provide rewards and discounts for people who use transit, people who carpool, or people with low incomes who purchase a bicycle or electric bike
- Traffic Calming: Install traffic calming on local streets to minimize cut-through traffic
- Curb Managment: Manage curbs to reduce double parking, especially in bike and transit lanes
- Bike and scooter share: Increase the availability of bike and scooter share
- Mobility hubs: Increase bike friendly amenities at transit stations, such as secure bike parking

Out of 657 total survey responses received, 501 provided a home zip code.
140 respondents submitted a write-in response indicating support for other strategies

Overview of Findings from Survey Question 2

Question Text: Specific to building a complete active network, how important are each of the following priorities?

Response Options: (rank each option as "Important," "Not sure," or "Less Important")

- ☐ Reduce speeds and create space on neighborhood streets to support walk and bike trips within my neighborhood or to nearby commercial areas
- ☐ Separated, high quality bike networks that help me travel between neighborhoods and to major destinations like downtown
- ☐ Make it easier to walk or bike to transit

TRENDS AND OBSERVATIONS

Responses by zip code are shown in Figure 5, Figure 6, and summarized in Table 3.

Option A:

Support for reducing speeds and creating space on neighborhood streets to support walk and bike trips was highest in central neighborhoods adjacent to highway 101 (zip codes 94103 and 94110). While the rate of support was also high in zip codes 94158 and 94132, few responses were received from those areas (2 and 3 respectively). Compared with support for Options B and C, support for Option A was relatively lower in zip codes 94107 and 94112.

Option B:

Support for separated, high quality bike networks that connect to other neighborhoods and downtown was highest in central neighborhoods along highway 101 and near BART stations (zip codes 94110 and 94103), as well as along the panhandle (zip code 94117). In some of these neighborhoods, such as zip code 94103, bicycle network connectivity is already high today. In others, such as zip code 94110, the bicycle network covers only part of the neighborhood or there are network gaps.

Support for bike network improvements was moderate in the District 1 and District 4 despite limited existing bicycle infrastructure, though the total number of responses was limited in these areas. The availability of lower-vehicle volumes on neighborhood streets that are comfortable for more types of bicyclists may be one reason for the lower level of support for bicycle improvements expressed by respondents from these areas.

Option C:

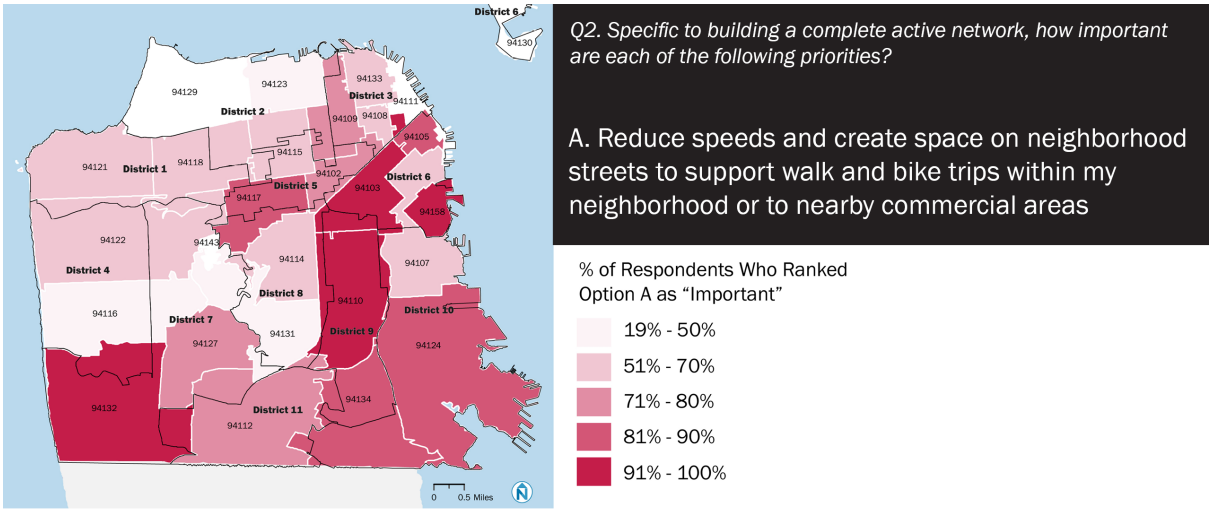
Support for making it easier to walk or bike to transit was higher in central areas along BART and near Caltrain stations (zip codes 94103, 94107, 94158, 94102, 94117, and 94112). Support was more moderate in zip code 94110, despite close proximity to BART.

Support was mixed along Muni Metro lines in all parts of the city. In some zip codes (such as 94132, 94127, 94117, and 94124), support was 70% or higher. In others, support was moderate (94122, and 94114) or low (94116, and 94131). Compared with support for Options A and B, support for Option C was relatively lower in the Mission (94110) and Lower Pacific Heights (94115).

Table 3: Importance of Options A, B, and C by Zip Code

ZIP CODE	TOTAL RESPONSES	A IS IMPORTANT	B IS IMPORTANT	C IS IMPORTANT
94103	97	89	80	89
94114	34	20	22	21
94112	33	24	23	26
94124	33	27	23	22
94117	29	25	27	26
94110	28	26	27	20
94102	27	21	21	24
94109	24	18	16	20
94107	23	15	18	21
94116	21	4	6	5
94121	20	13	13	13
94134	20	18	14	14
94122	17	11	8	11
94133	13	8	7	5
94118	12	7	7	6
94115	10	7	9	5
94105	8	7	6	6
94127	8	6	6	6
94131	8	4	4	4
94123	6	3	3	4
94104	5	5	5	5
94108	5	3	1	3
94132	3	3	1	3
94014	2	2	2	2
94158	2	2	2	2
94609	2	1	2	2
94010	1	1	1	1
94015	1	1	1	1
94066	1	1	1	1
94402	1	1	1	1
94519	1	1	1	1
94523	1	1	0	1
94530	1	1	1	1
94611	1	1	1	1
94612	1	1	1	1
94618	1	1	1	1
94703	1	0	1	1

Figure 5: Question 2 Responses by Zip Code (Options A, B, and C Alone)

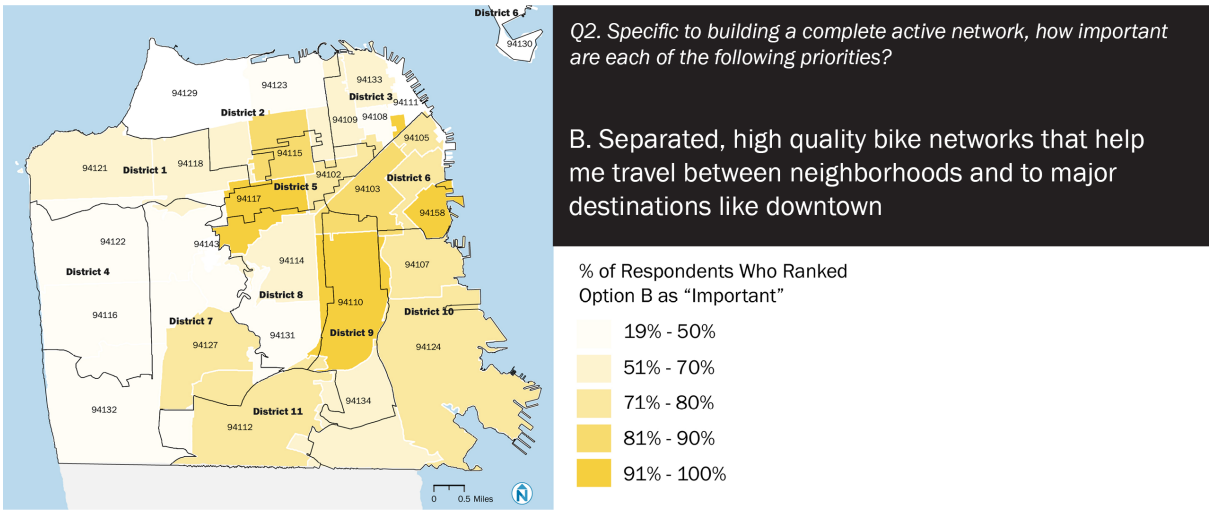


Q2. Specific to building a complete active network, how important are each of the following priorities?

A. Reduce speeds and create space on neighborhood streets to support walk and bike trips within my neighborhood or to nearby commercial areas

% of Respondents Who Ranked Option A as "Important"

- 19% - 50%
- 51% - 70%
- 71% - 80%
- 81% - 90%
- 91% - 100%

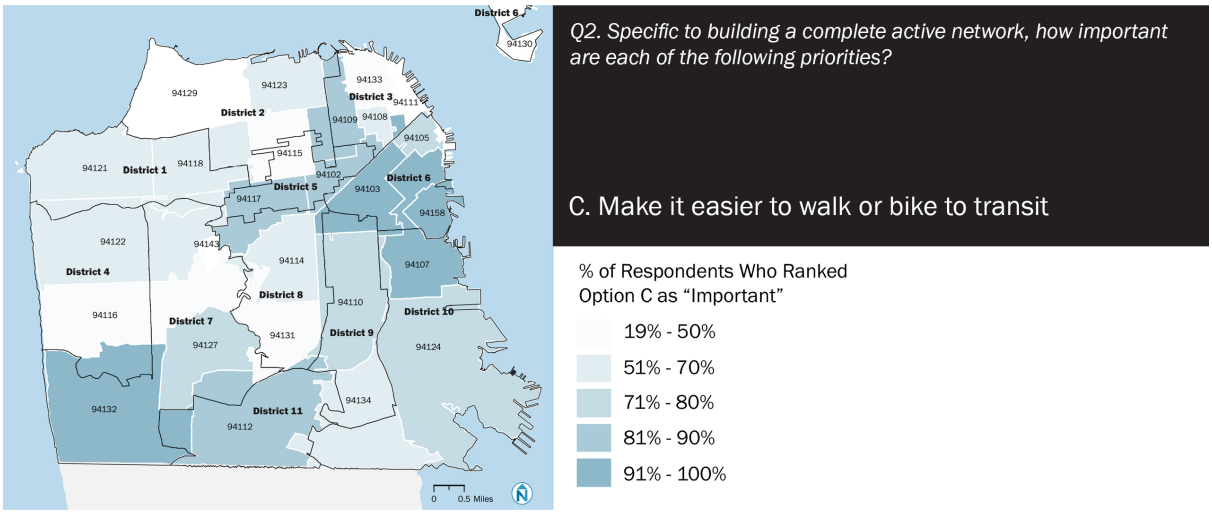


Q2. Specific to building a complete active network, how important are each of the following priorities?

B. Separated, high quality bike networks that help me travel between neighborhoods and to major destinations like downtown

% of Respondents Who Ranked Option B as "Important"

- 19% - 50%
- 51% - 70%
- 71% - 80%
- 81% - 90%
- 91% - 100%



Q2. Specific to building a complete active network, how important are each of the following priorities?

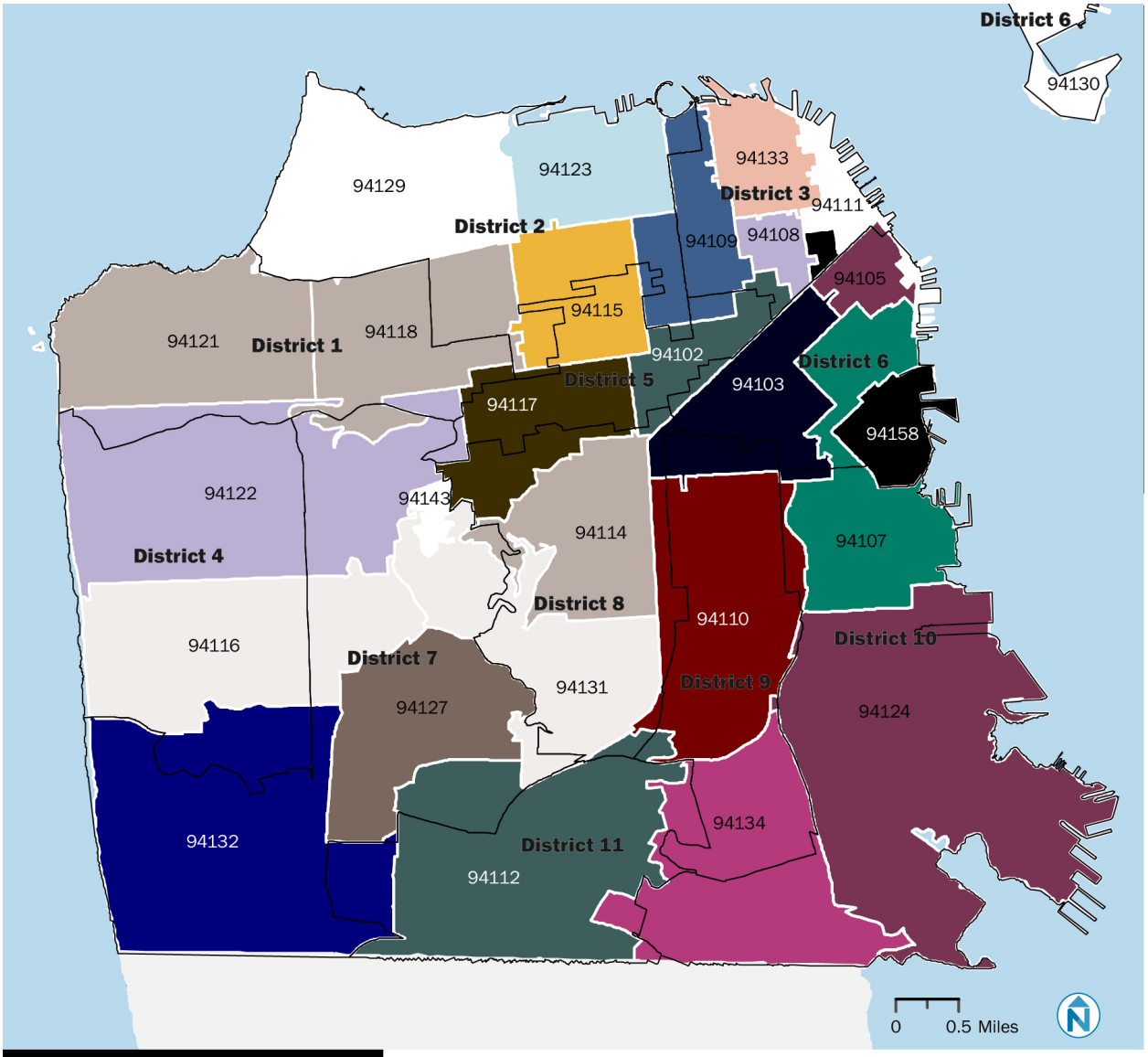
C. Make it easier to walk or bike to transit

% of Respondents Who Ranked Option C as "Important"

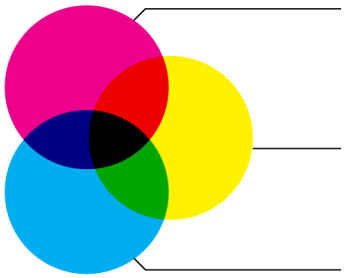
- 19% - 50%
- 51% - 70%
- 71% - 80%
- 81% - 90%
- 91% - 100%

Out of 657 total survey responses received, 501 provided a home zip code

Figure 6: Question 2 Responses by Zip Code (Options A, B, and C Combined)



Q2. Specific to building a complete active network, how important are each of the following priorities?



% of Respondents who ranked option A as first choice
Lighter color = fewer respondents

% of Respondents who ranked option B as first choice
Lighter color = fewer respondents

% of Respondents who ranked option C as first choice
Lighter color = fewer respondents

Out of 657 total survey responses received, 501 provided a home zip code.

Overview of Findings from Survey Question 3

Question Text: What are the top strategies that we should pursue to make our streets safe for everyone?

Response Options: (select as many options as desired)

- ☐ Reduce speed limits
- ☐ Dedicate more space on our roads for people to walk and bike
- ☐ Improve safety at on- and off-ramps
- ☐ Advocate for authority to use speed safety cameras
- ☐ Install traffic calming (e.g., sidewalk extensions, improved visibility at intersections)
- ☐ Operate programs to improve safety (e.g., safe routes to schools)
- ☐ Other. Are there additional safety strategies we should consider?

TRENDS AND OBSERVATIONS

Support for all response options was similar. Responses by zip code are shown in Table 4. Installing traffic calming (option 5) accounted for the highest proportion of all responses submitted (22%); programs to improve safety (Option 6) accounted for the lowest proportion of all responses submitted (9%). Most respondents selected 2 or more strategies, and respondents selected an average of 2.8 strategies per response.

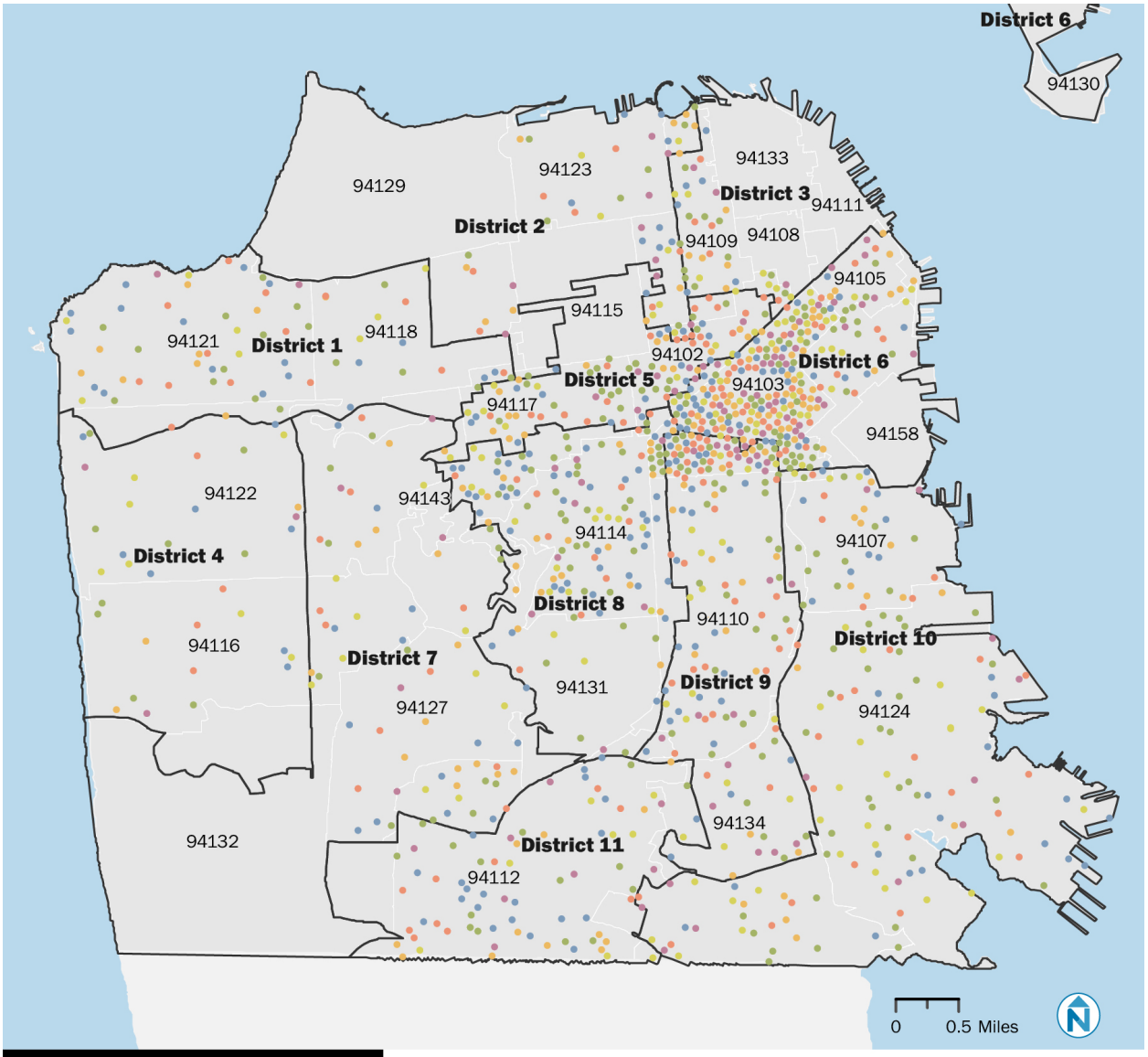
The geographic distribution of responses is shown in Figure 7. Support for all options was generally evenly balanced in responses from most neighborhoods and districts. Traffic calming had the highest proportion of support in zip code 94124. Safety programs had the highest proportion of support in zip code 94116.

122 write-in responses were submitted as additional safety strategies to consider. Write in responses addressed a wide range of ideas and strategies. Many emphasized shared responsibility for road safety amongst all modes. Some respondents suggested there were opportunities to better achieve road safety goals if existing regulations were more effectively enforced or if road users were better educated about road safety.

Table 4: Strategy Support and Response Rate by Zip Code

ZIP CODE	TOTAL RESPONSES	REDUCE SPEED LIMITS	DEDICATE MORE SPACE ON OUR ROADS FOR PEOPLE TO WALK AND BIKE	IMPROVE SAFETY AT ON- AND OFF-RAMPS	ADVOCATE FOR AUTHORITY TO USE SPEED SAFETY CAMERAS	INSTALL TRAFFIC CALMING	OPERATE PROGRAMS TO IMPROVE SAFETY	OTHER
94103	97	50	46	32	53	58	36	4
94114	34	8	22	10	11	22	7	11
94112	33	13	24	9	17	20	11	1
94124	33	17	14	20	4	27	6	3
94117	29	11	22	9	11	24	1	5
94110	28	17	21	8	11	20	4	2
94102	27	14	12	12	8	15	11	4
94109	24	9	13	7	11	13	6	6
94107	23	9	13	6	11	16	4	7
94116	21	5	5	6	3	5	1	14
94121	20	9	13	5	7	11	2	6
94134	20	9	7	12	7	14	9	1
94122	17	4	7	7	6	8	4	6
94133	13	0	8	5	5	8	5	3
94118	12	6	4	3	4	5	2	6
94115	10	2	6	4	7	7	0	2
94105	8	2	2	2	5	3	6	2
94127	8	3	6	2	3	2	1	5
94131	8	2	2	3	2	4	1	4
94123	6	3	2	2	1	4	2	2
94108	5	2	3	3	2	3	2	0
94104	5	0	3	0	5	5	2	0
94132	3	0	1	1	1	2	1	1
94014	2	1	2	0	1	1	1	0
94158	2	1	1	0	1	1	0	2
94609	2	0	2	1	0	2	0	0
94010	1	0	1	0	1	1	0	0
94015	1	1	0	1	0	1	0	0
94066	1	0	1	0	1	1	0	0
94402	1	1	1	0	0	1	0	0
94519	1	0	0	1	0	1	1	0
94523	1	1	0	1	1	0	0	0
94530	1	1	1	0	0	0	0	1
94611	1	1	1	0	1	0	0	0
94612	1	1	1	0	0	1	0	0
94618	1	0	1	1	0	1	0	0
94703	1	0	1	0	0	1	0	1
Other*	162	69	70	54	51	88	51	14

Figure 7: Question 3 Responses by Zip Code



Q3. What are the top strategies that we should pursue to make our streets safe for everyone?

- Complete streets: Dedicate more space on roads for people to walk and bike
- Install traffic calming
- Freeway ramp safety: Improve safety at on- and off-ramps
- Speed safety cameras: Advocate for authority to use speed safety cameras
- Reduce speed limits
- Safety programs: Operate programs to improve safety

Out of 657 total survey responses received, 501 provided a home zip code.
113 respondents submitted a write-in response indicating support for other strategies

Conclusion

Preferences for different types of road safety improvements and strategies vary geographically. Some strategies, such as providing rewards and discounts for transit, carpooling, and bike purchases, received more consistent support across all neighborhoods. Others, such as expanding bike and scooter share services, received more variable levels of support from neighborhood to neighborhood.

Understanding where different types of road safety improvements align with local preferences can be helpful when developing safety interventions and will require additional targeted, neighborhood-level outreach and collaboration with local residents. Learnings from these outreach efforts can inform future transportation funding decisions to help align safety strategies with ConnectSF goals and community transportation needs. In addition to future community engagement to better understand road safety priorities, there may be opportunities to incorporate learnings from this survey into future Vision Zero planning and strategy implementation efforts.

[this page intentionally left blank]

SFTP 2050: STRATEGIC TOPIC PAPER

Road User Charge (RUC)

Introduction

In the United States, highway and road repairs and maintenance have historically been funded through gas tax revenues. Now levied at both the federal and state levels, gas taxes in the United States were first introduced in Oregon in 1919 "for the repair of the damage done to said highways by such vehicles, machines and engines traveling thereon."[1] Gas taxes were meant to capture revenues to pay for maintenance of roads that gas-powered vehicles were driving on. They are easy to administer, and the cost of the tax is "hidden" in the consumer's overall cost of purchasing gas at the pump. Every state had a gas tax in place by the time the federal government put a federal gas tax in place in 1932.

Over time, taxing gasoline has become a less efficient way to recoup the maintenance costs of this country's roads. As the fleet of personal and commercial vehicles becomes more fuel efficient, drivers are purchasing less gas per mile driven while impacts on streets and highways remain consistent. The federal gas tax was increased to 18.4 cents per gallon in 1993 and is not indexed to inflation, which has increased by 77% since then, significantly diminishing the purchase power of the gas tax. At the state level, California's legislature passed Senate Bill 1 (SB 1), the Road Repair and Accountability Act, in 2017, increasing the state's gas tax by 12 cents and indexing it to inflation. However, due to increasing fuel efficiencies, revenues from the current gas tax model will continue to decrease. **California and the country cannot rely primarily on the gas tax to fund the maintenance and operations of vital transportation systems.**

A road user charge (RUC), also referred to as a vehicle-miles traveled (VMT fee), or simply a road charge, is a direct user fee where drivers are charged a per-mile fee to be invested back into the transportation system. Governments across the country and in Europe have become increasingly interested in the potential for a RUC as a more sustainable revenue source to replace or supplement the existing gas tax model. With new technologies allowing more accurate tracking of driving behavior, RUCs can more directly identify where roadway usage is taking place, charge drivers accordingly, and direct revenues to impacted locations. Furthermore, given the RUCs can also be tailored to include other policies, such as discounts or incentive programs for low-income drivers, or time-of-day or geographic-based congestion charges.

This white paper provides an overview of recent RUC pilot programs and ongoing collaborations in the United States and explores some of the policy questions that should be explored before the implementation of a RUC.

1 https://time.com/4803516/gas-tax-history/

National Context

Due to the declining purchase power of the federal gas tax, the United States Congress has had to transfer funds from other sources into the Highway Trust Fund to maintain solvency. In an acknowledgment of the gas tax structural issue, the Fixing America's Surface Transportation Act, or "FAST Act" of 2015, authorized the U.S. Department of Transportation (US DOT) to establish the Surface Transportation System Funding Alternatives (STSFA) Program. The STSFA program provides $15 million in fiscal year (FY) 2016 and $20 million in each of FYs 2017 through 2020, and intends to fund state-led demonstration projects that assess the design, acceptance, and implementation of a "user-based alternative revenue mechanism."

The US DOT has awarded three STSFA grants to the California Department of Transportation (Caltrans). In FYs 2016 and 2017, Caltrans received $750,000 and $1.75 million in funding to test a road user charge (RUC) pay-at-the-pump or charging station program. In FY 2018, USDOT provided Caltrans with a grant of $2.03 million to explore integrating the RUC program with emerging technologies and services, such as Usage-Based Insurance (UBI), Transportation Network Companies (TNCs), and Autonomous Vehicles (AVs).

The FAST Act expired in September 2020, and as of early November 2020 Congress was still working on proposals for a surface transportation reauthorization bill. The House Transportation Committee has proposed a $494 billion, five-year bill, including expanding existing state pilot programs to test RUC collection mechanisms. It would provide nearly double the funding from the FAST Act and would create a new, nationwide VMT pilot program. It remains to be seen what will emerge from the Federal legislative process.

Regional Context

Founded in 2013, RUC West is a consortium of 16 state transportation organizations that are working together to study the viability of per-mile charging. The consortium provides a platform for sharing best practices and research between participating states. RUC West member states are organized into three tiers based on their current progress towards advancing RUC in their jurisdiction. Tier 1 states (Oregon and Utah) have enacted policies to implement RUC programs. Tier 2 states (California, Colorado, Hawaii, and Washington) are piloting RUC programs. Tier 3 states (Arizona, Idaho,

Montana, Nebraska, Nevada, New Mexico, North Dakota, Oklahoma, Texas, and Wyoming) are researching RUC.[1]

RUC West has already funded 18 projects related to the feasibility and evaluation of road usage charging. Eleven of the member states, one of which was California, participated in the RUC West Regional System Definition and Pilot Planning Project, which is partially funded by the FAST Act. Beginning in 2018, this pilot developed and tested a RUC system that operates across multiple states. The final project deliverable was a white paper titled Steps Forward: Vendor Perspectives. Other current projects of RUC West include the Oregon User Charge program, My OReGo; the California Road Charge Pilot Program; the Colorado Department of Transportation Road User Charge Program; the Hawaii Road Usage Charge Demonstration; and the Washington State Road Usage Charge Pilot Program. The Washington and Oregon programs are summarized below.

WASHINGTON

The Washington State Transportation Commission (WSTC) conducted the Washington Road Usage Charge (WA RUC) Pilot Project in 2018-2019, to explore the potential of a gas tax replacement to fund the state's roads and bridges. In December 2019, the WSTC adopted recommendations on how the state can begin to transition toward a RUC system and away from the state gas tax. The WSTC recommended:

- A slow and gradual approach to introducing road usage charging, including a start-up phase focused on vehicles that pay little or no gas tax (ie plug-in electric and hybrid vehicles) and with additional testing using state-owned vehicles
- Implementation of privacy protection measures specific to a RUC system
- Restriction of revenues to highway-related expenditures through a state constitutional amendment
- Maintenance of funding levels for non-highway programs that currently receive gas tax revenues through the transition period
- Continued research on key topics such as potential equity impacts, mileage reporting options and rate-setting, maximizing compliance, and in collaboration with other states, approaches to reducing administrative and operational costs and efficient application across borders

1 https://www.rucwest.org/resources/

The WSTC report was submitted to the state legislature, the governor and the Federal Highway Administration in early 2020[1]. The state legislature and governor will ultimately decide whether a RUC will be implemented in Washington.

OREGON

Oregon launched a voluntary, statewide RUC program in 2015 after completing pilot programs in 2007 and 2012. The program, known as OReGO, assesses a per-mile charge to participating drivers, who track miles driven and fuel consumption via a vehicle data port dongle. Program participants pay 1.8 cents per mile on Oregon roads, and receive a credit for fuel tax they pay (up to and not exceeding the road charges paid). The state's gas tax is 36 cents per gallon and the program is limited to vehicles that get at least 20 miles per gallon (the break-even point for the program)[2].

Despite this incentive, only 1,600 had signed up for OReGO as of November 2019, with only 600 as active participants. The state increased registration fees effective in 2020, and included an additional incentive for participation in the OReGO program. The state's vehicle registration fees are based on miles-per-gallon thresholds, with vehicles with higher mileage rates (more fuel efficient vehicles) paying higher fees. However, high-mileage vehicle (i.e. 40 mpg or above) drivers enrolled in OReGO receive a 50% discount on registration fees. Plug-in electric vehicles receive an even steeper discount over 70% off standard registration fees.[3] It is too soon to know whether this new incentive is attracting new program participants.

California's Road Charge Pilot Program

Prior to participation in the RUC West pilot, California ran a statewide RUC Pilot Program in 2016, with five thousand participants over a 9-month period. The program was authorized in 2014, with Senate Bill (SB) 1077 (DeSaulnier) directing the California Transportation Agency (CalSTA) to implement a pilot program to identify and evaluate issues related to the potential implementation of an RUC program in California. The bill also established a Road Usage Charge Technical Advisory Committee (Road Charge TAC), to make recommendations on the design of the pilot program. The intent of SB 1007 was to explore the viability of replacing the state gas tax with a RUC.

The Road Charge TAC met over the course of a year, and in December 2015 delivered their Road Charge Pilot Design Recommendations Report to CalSTA for

1 https://waroadusagecharge.org/

2 https://www.myorego.org/how-it-works/

3 https://www.governing.com/news/headlines/Oregon-to-Introduce-New-Car-Fees-as-Gas-Tax-Is-Phased-Out.html

implementation. Their recommendations for the development and implementation of the RUC pilot program were organized by four principles:

- **Feasibility:** the viability of recording and reporting of vehicle miles traveled for a statewide road charge system
- **Complexity:** the degree of difficulty of implementing a statewide road charge system
- **Security:** ensuring the safeguarding of personally identifiable information and data in a statewide road charge system
- **Acceptability:** surveying the acceptability of a road charge as an alternative to the gas tax[1]

The Road Charge TAC also identified additional policy areas that should be considered for additional research and evaluation after the completion of the pilot program[2].

Beginning in 2016, under the direction of CalSTA, the California Department of Transportation (Caltrans) oversaw the pilot RUC program based on the recommendations from the Road Charge TAC. The pilot program launched on July 1, 2016, beginning with 3,000 participating vehicles and growing to 5,000 in August. Caltrans recruited participants from a broad range of demographic categories, with an emphasis on geographic diversity. Participants drove passenger vehicles, agency and business fleets, and commercial trucks. Caltrans established a revenue neutral per mile charge of 1.8 cents but ultimately did not collect the fee assessed, as the pilot was informational. Pilot participants were able to choose from multiple mileage reporting methods and reporting technologies. By offering different options, Caltrans was later able to compare effectiveness while also encouraging innovation from suppliers. Both manual and automated reporting methods were available. Manual methods included time and mileage permits and odometer verifications. Automated methods used devices, either with or without GPS, to track miles driven. Reporting technologies included plug-in devices (i.e. Progressive Snapshot), smartphones, in-vehicle telematics (i.e. OnStar) and specialized commercial meters.

Though Caltrans focused on miles driven by Californians in state for the pilot, the agency ran a three-month simulation of interoperability with Oregon's OReGO RUC system as well. Only participants who used a reporting method with GPS were able to discount out-state and other nontaxable miles from their total. Only six drivers from out of state participated in the pilot.

1 https://dot.ca.gov/-/media/dot-media/programs/road-charge/documents/rcpp-final-report-a11y.pdf

2 https://catc.ca.gov/-/media/ctc-media/documents/ctc-reports/other-reports/201512-road-charge-pilot-design-recc-a11y.pdf

The California RUC pilot program concluded in December 2016 with the California Road Charge Pilot Program 2017 Final Report[1]. The pilot program successfully demonstrated the feasibility of a statewide RUC program, and surfaced valuable observations during the development, implementation, and evaluation of the pilot. For example:

- The pilot was successful in studying the viability of using multiple mileage recording and reporting options, including manual and automated methods, and demonstrated the viability of using third-party vendors.
- Privacy and data security provisions were implemented with no breaches or complications.
- In post-pilot surveys, 85% of participants expressed overall satisfaction with the pilot. 73% said that a RUC is more equitable than the gas tax, an increase from 66% before the pilot, and 61% said that they were more aware of the amount they pay for road maintenance.

The program final report also identified significant questions and issues that remain before a program could be implemented more widely and with full, paid participation. The final report recommends additional research and testing including:

- Investigating a pay-at-the-pump option for the road charge system, which could replicate current user experience and potentially reduce administrative costs and garner greater public acceptance. Caltrans conducted research on this option from 2017-18, summarized in a report to the legislature[2] which recommends a pilot demonstration to provide an initial proof-of-concept. This pilot has not yet taken place.
- Testing the flow of revenues, since the RUC pilot only simulated an invoicing/payment process. A number of state agencies/ departments could be involved, and additional testing and evaluation of that process would identify potential for improvement in full implementation. From a broader organizational perspective, many agencies and departments would be impacted by a potential transition from the gas tax to a road charge, and that process would require careful consideration and coordination to be successful.

1 https://dot.ca.gov/-/media/dot-media/programs/road-charge/documents/rcpp-final-report-a11y.pdf

2 https://dot.ca.gov/-/media/dot-media/programs/legislative-affairs/documents/road-charge-pay-at-the-pump-research-rept-to-leg-a11y.pdf

- Engaging a wide range of stakeholders to align evolving technologies with the RUC program framework. This would include working with auto manufacturers on in-vehicle telematics, and developing technical standards to allow for easier mileage information collection but still permit innovation.

In 2018, Senate Bill 1328 (Beall) extended the operations of the Road Charge TAC until January 1, 2023. The group has met periodically since then, primarily tracking national level activities and the work of other members of RUC West. At present, with the passage of 2017's SB 1 (Beall), and given the economic downturn at the beginning of 2020, there is not a large political push to accelerate the implementation of a RUC in California, but behind the scenes research and collaboration across states continues.

What would it take to implement here?

California is still in the research and testing phase for a RUC, with multiple outstanding questions remaining. In 2017, the Pilot Program Final Report stated that 2025 would be the earliest that any RUC program could be broadly implemented in California. Implementation of a full RUC program in California would require state authorizing legislation to establish the taxation authority and designate an administering agency. After their pilot programs, the state Departments of Transportation from Oregon and Washington both recommended a slow, incremental phasing-in process for this transition.

A statewide (or larger) RUC program provides an opportunity to layer in local programs at the city, county or regional level. Small scale RUC programs outside of the state or Federal context are infeasible due to administrative costs and the amount of travel across county lines. San Francisco would benefit greatly if allowed to layer local programs into a statewide program. These programs could do more than collect revenues, and be designed to advance local policy priorities, such as time-of-day or vehicle occupancy-based pricing, described further in the next section.

Policy Considerations

For the California pilot program described above, the primary policy goal was to test the viability of replacing state gas tax revenues with RUC revenues. The rate was established to approximate a system that would generate as many revenues as the state gas tax did at the time, without any variation across vehicle or trip type. However, **one of the significant benefits of an RUC program is that it can implement pricing based on the costs imposed on the system**, more directly than the gas tax. The most

efficient way to address externalities is to incorporate them into the prices people pay. To do this comprehensively for the transportation system, an RUC program could be designed to address a number of externalities of driving with varied rates for drivers based on a variety of factors. This has the added benefit of sending a more accurate signal about the cost of driving to drivers, who may be incentivized to drive less.[1]

Listed below are some of the ways that an RUC program could help advance local, regional and state goals:

- **Roadway wear and tear:** this is commonly thought of as the primary intent of a RUC. The RUC rate should be set to cover the costs of roadway maintenance at a minimum, but should not be limited to these expenses.


Economic Vitality


Safety and Livability

- **Traffic fatalities and serious injuries:** In 2018, over 36,000 people were killed in traffic crashes.[2] Safety programs have helped reduce fatalities over the past 40 years, but in general, the rate of traffic deaths and serious injuries tracks with traffic volumes. The RUC program should capture costs incurred from these crashes and invest revenues in safer bicycle and pedestrian infrastructure to help move us toward zero traffic fatalities.

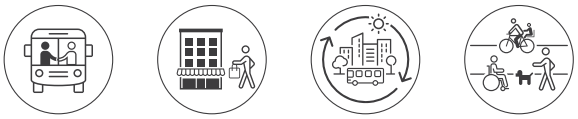

Safety and Livability


Environmental Sustainability

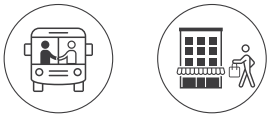
1 https://itif.org/publications/2019/04/22/policymakers-guide-road-user-charges

2 https://www.nhtsa.gov/traffic-deaths-2018

- **Traffic congestion:** High traffic volumes lead to high levels of traffic congestion, creating an economic cost on businesses. Public transit buses and streetcars, which move people more efficiently than single-occupancy vehicles, are also caught that traffic. Cities or regions may be interested in including a congestion charge as part of the RUC charging drivers a per-mile surcharge for driving in crowded downtown areas during peak hours. Revenues captured through a congestion charge should be spent on projects such as increased transit service and improved bicycle and pedestrian infrastructure which would give drivers better alternative options to driving during peak times. Another way to reduce congestion could be to charge lower rates to vehicles with higher passenger occupancy, such as carpools, vanpools or transit vehicles.



- **Social and economic inequities:** The built environment in the United States largely requires people to drive between their homes, jobs, schools, errands, and other points of interest. This imposes significant costs to households. In many metropolitan areas, lower-income households are being displaced out of well-connected, centrally located urban neighborhoods into suburbs far from employment and educational opportunities. To help mitigate the social and economic impacts of this car-centric built environment, drivers of different incomes could be charged different rates to help mitigate the impacts of the RUC on low-income households. Alternatively, there may be an opportunity to integrate incentive programs, such as offering RUC credits for transit trips taken, into the RUC program.



- **Air emissions:** The transportation sector generates the largest share of greenhouse gas emissions at 28% in 2018, primarily from burning fossil fuel.[1] The RUC program could set lower rates for all-electric or hybrid vehicles, which produce fewer (or no) emissions per mile. However, it may be more efficient to use a gas tax to capture the air emissions costs incurred by gas-powered vehicles, since that is an existing, easy to administer tax with a direct nexus to vehicle emissions.

Environmental Sustainability

- **Impacts to industry:** There have been concern raised by rural interests that the RUC could impose additional costs on the agricultural sector. There may be a desire to continue subsidizing certain industries through lower rates. Conversely, there may be a push to disincentivize other industries through higher rates, such as transportation network companies that have been shown to have significant impacts on congestion in cities like San Francisco.

Economic Vitality

While there were no exemptions or surcharges built into the California RUC pilot program, the RUC Technical Advisory Committee did acknowledge that for a full-scale RUC program, additional consideration would need to be given to other policy issues. The California pilot also did not collect actual revenues, and in the final report, the question of how to use road charge revenues was touched upon, but deferred as a policy question, noting that the current gas tax funds a myriad of uses, and that the road charge could either follow a similar use pattern or could fund minor to major reforms to how investments are made. The Oregon and Washington pilot programs discussed here also looked at RUC as an opportunity to replace gas taxes, developing the RUC independently from consideration of revenue expenditures to avoid the added complexity.

Despite the approaches taken by these states, there may be a desire to **maintain some level of the existing gas tax**, which not only acts as a revenue generator, but also to

1 https://www.epa.gov/ghgemissions/sources-greenhouse-gas-emissions

tax fuel consumption which has significant negative externalities (e.g., greenhouse gas emissions). Maintaining a gas tax would also maintain the ongoing gas tax savings drivers see when purchasing an all-electric or hybrid vehicle, and help accelerate the fleet conversion to cleaner air vehicles.

One of the most significant concerns about an RUC program is that it would be regressive and have a disproportionately negative impact on lower-income households. Studies have found that gas taxes are regressive, with lower-income households paying a higher percentage of their income than high-income households. Furthermore, lower-income households tend to drive older, less fuel-efficient vehicles, paying more gas tax per mile driven than higher-income households with more efficient vehicles.[1] In this way, lower-income households would likely benefit from an RUC by leveling the per-mile fee; a 2010 study in Oregon found that a road charge is less regressive overall than a consumption-based fuel tax. The RUC could also invest revenues in public transit, which on average is used more by lower-income households or could incorporate lower rates for lower-income households as discussed above.

1 https://itif.org/publications/2019/04/22/policymakers-guide-road-user-charges

SFTP 2050: STRATEGIC TOPIC PAPER

Transportation Demand Management (TDM) and Long Range Planning

Purpose

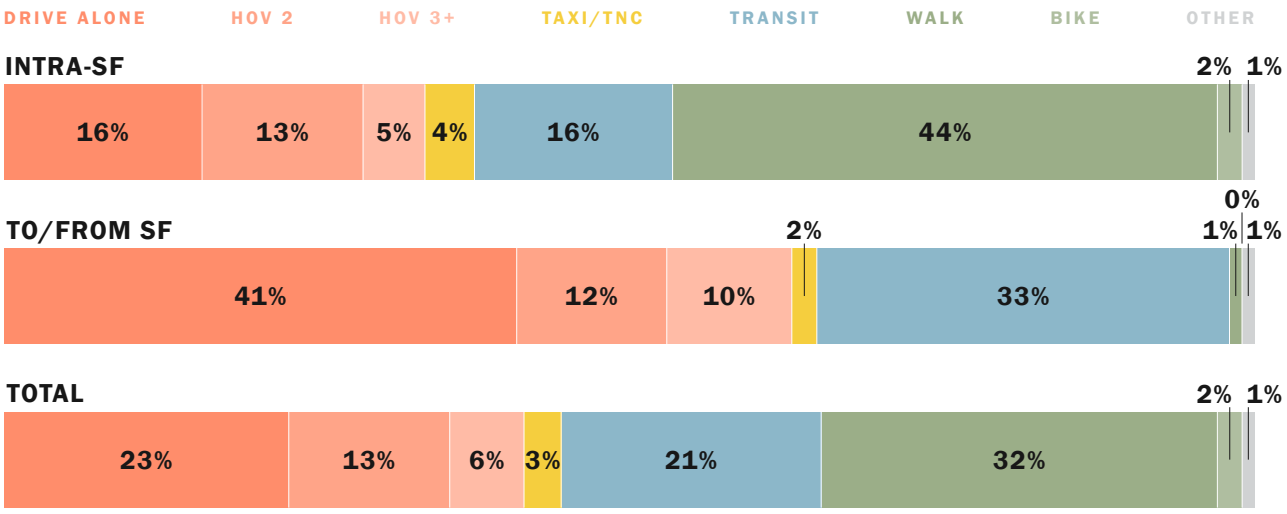
Long range transportation plans (LRTP) coordinate planning projects and prioritize projects, activities, and programs to reach defined goals for a 20 (or more) year period. LRTPs are typically written at a regional or county level and include a financial needs analysis to assess the financial ability to fund the projects included in the plan.

As part of the ConnectSF process, San Francisco will develop the San Francisco Transportation Plan (SFTP) for 2050. The SFTP will recommend a set of policies and projects, under constrained and visionary budget scenarios, that advance the city towards local and regional goals and help create an effective, equitable, and sustainable transportation system in San Francisco. Transportation Demand Management (TDM) is being explored as a policy and program area for the SFTP to support a reduction in vehicle trips and related greenhouse gas emissions.

TDM is a systematic approach to shift how, when, and where people travel through programs and policies and is an effective tool that San Francisco and other cities are using to address the rise in congestion associated with population and job growth. TDM was included in San Francisco's 2013 SFTP and is included in long range plans for cities across the country because it is a proven tool to decrease the dependence on driving and maximize the efficiency and effectiveness of the transportation system.

Of trips to, from, and within San Francisco on a typical weekday, 45% are taken by driving modes, and roughly half of those are drive-alone. Of trips entirely within the city, 37% are taken by driving modes. More than half of those driving trips are under two miles in length.

Figure 1: San Francisco Mode Share by Travel Market



Source: MTC/SFCTA 2018 – 2019 Travel Survey

Within San Francisco, the lengths of trips made by bicycle are similarly distributed to trips made by car, but there are more than 10 times as many driving trips under one mile as there are bike trips under one mile.

Table 1: Trip Length Distribution of Drive and Bike for Trips within San Francisco

	< 1 MILE	1 – 2 MILES	2 – 3 MILES	3 – 5 MILES	5 – 10 MILES	> 10 MILES
Drive	339,457	280,540	227,418	229,959	117,113	1,359
Bike	30,238	25,439	18,429	18,302	5,405	191
Share of Drive	28.4%	23.5%	19.0%	19.2%	9.8%	0.1%
Share of Bike	30.9%	26.0%	18.8%	18.7%	5.5%	0.2%

Source: MTC/SFCTA 2018 – 2019 Travel Survey

This research considers recent long range plans for regions, counties, and/or cities that cover San Francisco's peer cities – Austin, Seattle, Washington DC, and Portland. These peer cities have made strides in planning for and implementing TDM and have city contexts that are somewhat similar to San Francisco. In some cases, there are multiple plans reviewed for each peer city because the city falls within two plan areas; for example: Seattle, Washington is covered by the Puget Sound 2018 Regional Transportation Plan and the King County Metro 2016 Long Range Transportation Plan.

The purpose of this research is to catalog how the relevant long range plans incorporate TDM, the level of detail on goals, programs, and metrics, and relative funding and monitoring guidance that is established. The outcome of this research recognizes that San Francisco's existing TDM efforts could use improved definition of travel markets and evaluation methods to define potential long range TDM planning efforts that can be considered in SFTP 2050 to address these gaps. Table 2 provides an overview of the peer cities included in this research, relevant long range plans, and the TDM topic areas that each plan includes – TDM goals are defined priority trips or goals to address, programs are specific programs/policies/incentives, implementation includes direction for how to implement programs, monitoring includes direction for how programs will be assessed over time, and funding includes specific funding needs for the TDM program.

Table 2: Peer City Plans Reviewed and Topics Included

PEER CITY	PLAN	AGENCY	TDM GOALS	PROGRAMS	IMPLEMENTATION	MONITORING	FUNDING NEED
Portland, Oregon	2018 Regional Transportation Plan	Oregon Metro[1]	X				X
Seattle, Washington	2018 Regional Transportation Plan	Puget Sound Regional Council[2]	X	X*	X*	X*	
Seattle, Washington	2016 Long Range Transportation Plan: “Metro Connects”	County Metro[3]	X				
Washington, DC	2014 Multimodal Long Range Transportation Plan: “MoveDC”	District Department of Transportation[4]	X	X*			
Austin, Texas	2020 Regional Transportation Plan	Capital Area MPO[5]	X	X*		X*	
Austin, Texas	Strategic Mobility Plan	City of Austin[6]	X			X	

*notes that topic is included in a TDM action plan appendix item

1 Regional Transportation Plan, Oregon Metro, 2018. https://www.oregonmetro.gov/sites/default/files/2018/07/02/draft2018RTP_publicreviewweb.pdf

2 Regional Transportation Plan, Puget Sound Regional Council, 2018. https://indd.adobe.com/view/1af394e0-4e37-4982-9155-a2ee1e221b75

3 Long Range Transportation Plan: Metro Connects, King County Metro, 2016. http://metro.kingcounty.gov/planning/long-range-plan/

4 Multimodal Long Range Transportation Plan: MoveDC,District Department of Transportation, 2014. https://movedc-dcgis.hub.arcgis.com/datasets/c8a5dc8c069e46b1927d7088bec44f28

5 Regional Transportation Plan, Capital Area MPO, 2020. https://www.campotexas.org/regional-transportation-plans/2045-plan/

6 Strategic Mobility Plan, City of Austin, 2019. https://app.box.com/s/7aiksxmwwgymalsty0lm21wingk0slug

Findings of TDM in Peer City Long Range Transportation Plans

Each of the reviewed plans discuss the need for TDM and recognize it as a way to shift travel behavior away from drive-alone trips and make the transportation system more effective. However, the plans differ in targeted trip types, the inclusion of policy statements and strategic direction, programs, evaluation metrics, and funding needs.

Commute and resident focused trips are consistently emphasized in the reviewed plans; other trip types include visitors, underserved communities, school trips, and city employees. Plans covering Seattle, Austin, and Washington DC include detailed, regional TDM Plans as appendix reports. These plans define specific programs and guidance for implementation and, in some cases, include monitoring and evaluation guidance; this information is summarized in the relevant plans. The Oregon Metro 2018 Regional Transportation Plan is the only plan to identify funding needs for TDM priority areas, which accounted for 2 percent of the constrained project list. The City of Austin is the only city to establish a 20-year plan (the Strategic Mobility Plan), independent from the region's LRTP; it includes specific policies and targets to address resident, visitor, and school trips. The variation in how TDM is included in each of the reviewed plans may be a result of each city basing TDM decisions on local travel behaviors and patterns and past TDM initiatives.

Table 3 provides a summary of how each plan incorporates TDM; details of the appendix TDM Plans are not included in this summary.

Table 3: Reviewed Peer City Long Range Transportation Plan Summaries

PEER CITY	REPORT	AGENCY	OVERVIEW OF TDM	TRIP TYPES	PRIORITIES AND PROGRAMS	IMPLEMENTATION GUIDANCE	FUNDING	MONITORING
Portland, Oregon	2018 Regional Transportation Plan	Portland Metro	TDM is included as a component of Transportation System Management and Operations as a way to propose travel options and programs to reduce the demand for drive-alone trips. The established Regional Travel Options program oversees the TDM efforts and the RTP includes policy direction to expand commuter programs, individual marketing, and other tools to increase choice awareness and to increase benefits through partnerships to expand efforts outside of the Portland area and meeting the needs of historically underserved communities.	• Commuter • Residents	• Local program implementation • Individualized marketing • Commute programs • Public awareness campaign • Travel options support tool	Not included	Metro coordinates partner efforts, sets strategic direction, evaluates outcomes and manages grant funding. TDM projects in the RTP account for 2% of the constrained project list; estimated capital cost of $127M (2016 dollars)	Not included
Seattle, Washington	2018 Regional Transportation Plan	Puget Sound Regional Council	TDM is an efficiency improvement to make lower-cost, higher-efficiency options easier to use and more readily available. The primary objective of TDM in the RTP is to connect people with options that optimize the capacity of the system. The plan includes guidance for the types of strategies to be included and potential funding sources. A Regional TDM Action Plan is included as an appendix item.	• Commuter • Residents	• Expand programs • Provide information • Enhance existing system • Maximize new investments • Influence policy • Research and advocate	For each of the strategy areas, the Regional TDM Action Plan provides high-level actions and identifies potential implementers	Included as a potential funding allocation from roadway pricing and tolling. No specific budget or potential funding amount is included.	The TDM Action Plan identifies 3 overarching areas to monitor, independent of the performance evaluations for specific actions: • Overall and commute mode split regionally and by county • Transit ridership • Number of vanpools

PEER CITY	REPORT	AGENCY	OVERVIEW OF TDM	TRIP TYPES	PRIORITIES AND PROGRAMS	IMPLEMENTATION GUIDANCE	FUNDING	MONITORING
Seattle, Washington	2016 Long Range Transportation Plan: "Metro Connects"	King County Metro	TDM is included as a service quality investment to encourage individual choices that make the system work efficiently. The plan includes the development of new TDM methods using emerging technology and transportation pricing, as well as improvements to walking and biking paths to transit. The plan also identifies three initiatives: Research and develop new tools Support local and regional land-use decisions that benefit transit and other non-drive-alone modes Partnerships for implementation	• Commuter • Residents • School	• Community based social marketing • Shared mobility options • Parking management • Flexible transit service • Emergency Ride Home • Pass programs • Telework	Not included	Not included	Not included
Washington DC	2014 Multimodal Long Range Transportation Plan: "Move DC"	District Department of Transportation	TDM is included as a way to make a "smarter system" — efficient and effective — and manage demand to meet capacity. TDM is an individual policy effort in the LRTP and includes two recommended policies: Incorporate TDM programs into development projects that impact the ROW Develop policies and incentives to encourage car-light living The 2-year action plan includes Employer Transit Benefits provision. The TDM Action Element is included as an appendix item.	• Commuter • Resident • Developer	• Strategies included in the TDM Action Element	The TDM Action Element includes possible program structures but does not include implementation details.	Not included	Not included
Austin, Texas	Austin Strategic Mobility Plan	City of Austin	TDM is defined as a way to quickly reduce impacts on the transportation system. The plan addresses managing demand generally through land use, parking, curb management, TDM, and shared mobility. The TDM component includes two policies. Implement community-wide strategies to increase use of all transportation options and manage congestion Lead by example in offering, promoting, and implementing mobility options for City of Austin employees	• Commuter • Resident • School • Visitor	• Inter-departmental and inter-agency collaboration • Transportation equity	Long list of TDM implementation programs provided; no detailed guidance is provided	Not included	• Increase understanding of transportation options (by socioeconomic demographic) • Increase share of sustainable transportation • Reduce VMT • Increase work from home • Increase carpool work trips • Increase off-peak work trips • Increase number of people reached through TDM programming
Austin, Texas	2020 Regional Transportation Plan	Capital Area MPO	TDM is intended as a series of programs and infrastructures that contribute to an optimally efficient, multi-modal transportation system. TDM provides travelers, including those who drive alone, with choices. It prioritizes moving people. TDM's goals are to: improve travel reliability and air quality, manage congestion, and stimulate economic development. As such, TDM is included under the "Reliability" objective. The plan includes a Regional TDM Plan as an appendix item. This document includes priorities, vision, goals, strategy selection criteria, and monitoring and evaluation guidance.	• Commuter • Peak hour vehicle trips	• Support transit projects • Support managed lanes projects • Increase outreach, education, and awareness • Fund projects that address peak-hour congestion • Fund projects that manage work-zone queuing • Employer based programs • Data collection and sharing	Establishes goals, Metrics to measure progress, and project selection criteria	Recommends cost-benefit analyses based on data from agencies implementing TDM	Not included

Transportation Demand Management in San Francisco and the Bay Area

As a transit-first city, San Francisco has consistently worked to prioritize public transit and low-carbon modes, and reduce the number of trips made by car. The 2017 TDM Strategy plans through 2020 and identifies a long list of programs and policies in the areas of land-use development, street management, and customer focused campaigns to reinforce desired, sustainable travel behavior.[1]

There are also regional TDM efforts to reduce driving trips during the most congested times. MTC and BART TDM programs provide support for people traveling to and from San Francisco. Table 4 shows a sample of primary local and regional TDM programs that exist in the Bay Area region.

Table 4: Overview of Existing TDM Programs in San Francisco and the Region

PROGRAM	DESCRIPTION	RESPONSIBLE ENTITY
TDM Ordinance	Developers must incorporate on-site transportation amenities in new developments (that meet applicability criteria in Planning Code Section 169.3) to reduce vehicle trips; this program includes an evaluation effort.	SF Planning
SFpark	Demand-responsive parking pricing at metered spaces in select areas.	SFMTA
Commuter Benefits Ordinance	Businesses over 50 employees must offer a pre-tax, employer-paid, or employer-provided transportation benefits.	SF Environment
TDM for Tourism	The city works with the tourism industry to promote sustainable modes through maps and communications.	SFMTA
Emergency Ride Home	Covers the cost of a taxi trip or public transit fare for people who experience qualifying emergencies at work; starting in 2020, as a result of the Pandemic, the Essential Trip Card launched to discount essential trips made by taxi for seniors and people with disabilities	SF Environment
Reduced Transit Fares	Reduced fares for seniors, low-income residents, people with disabilities, students (Fast Pass/Class Pass), and youth	SFMTA
Safe Routes to School	Encourages students to walk and bike to school and increases their safety. All 103 SFUSD non-charter schools participate in the program	SFMTA, SFUSD, SFDPH, SF Environment

1 TDM Strategy 2017-2020, City and County of San Francisco, 2017. https://www.sfmta.com/sites/default/files/reports-and-documents/2017/12/11-7-17_item_11_transportation_demand_management_plan_0.pdf

PROGRAM	DESCRIPTION	RESPONSIBLE ENTITY
Transportation Management Associations (TMA)	Transportation Management Associations are established for the Financial District (TMASF) and Mission Bay (Mission Bay TMA), and is being established for Treasure Island (TIMMA). TMAs offer a combination of transportation services, information, and incentives for residents, visitors, and/or employees.	TMASF, Mission Bay TMA, TIMMA
Commuter Benefits Program	Requires all employers with 50 or more full-time employees to offer commuter benefits to their employees	BAAQMD
Bay Area Vanpool Program	Connects employees, provides rented van for shared trips, and subsidizes eligible commutes up to $350/month	MTC
Rideshare Program[1]	Facilitates carpool matches for people with similar commutes and offers reward points for carpool trips made	MTC and SF Environment
MTC SHIFT[2]	Equips employers with 3,000 or more workers with a commute management platform and covers up to 75% of the software subscriptions for up to 3 years	MTC
Regional Pricing	Discount passes for universities and colleges, Variable tolls on SFO Bay Bridge and on some Bay Area freeway lanes	BATA, BAIFA, and other BACTA
BART Perks	Pilot to determine if small incentives could shift travel outside of the morning peak period; ended in June 2019	BART

Applying Findings to the SFTP

As a city and county, San Francisco's long range transportation plan is unique from peer city LRTPs reviewed in this research. In most cases, the reviewed plans are written at a county or regional level and cover multiple cities and jurisdictions or are written by the city, independent of the larger planning area. Despite this difference, the reviewed plans, along with past city-led TDM efforts, provide direction on what TDM elements may be explored in the development of the SFTP.

This research reinforces that the TDM strategy and long range planning approach is unique to each jurisdiction. Consistently, peer cities analyzed travel trends and behaviors to identify target trips, guide program development, and define evaluation needs. While the City's TDM efforts included extensive data analysis, future efforts could include additional data data analysis to develop a strategy and more concrete goals for mode shift potential and evaluation guidance to understand the benefits of TDM programs in relation to the ConnectSF vision and goals. This could be further supported in the Transportation Element of San Francisco's General Plan through policies that support TDM implementation.

1 https://mtc.ca.gov/our-work/operate-coordinate/traveler-services/ridesharing

2 https://go.luum.com/mtc/

The SFTP could pursue three approaches to help guide future updates of the City's TDM Strategy:

- Establish vision and measurable goals for the future TDM strategy to guide development, implementation, and monitoring;
- Identify priority geographic areas, trip types, travel markets, traveler types, and success metrics to guide program selection and implementation details;
- Provide guidance for how to incorporate ongoing evaluation to track impacts on modeshift and cost effectiveness and evolve future iterations.

Based on peer city LRTPs, focus areas for future TDM initiatives may include commute trips, residential trips, visitor trips, and evaluation guidance, which are addressed in the city's 2017 TDM Plan. These focus areas could be further expanded to better understand trip markets, types, and patterns through detailed travel analysis and could establish an overarching, holistic perspective, guidance, and data-based strategic direction for TDM in San Francisco, while also setting concrete targets to evaluate and measure the impact of TDM investments overtime. Importantly, TDM planning and programs should lead with equity, identifying how specific TDM measures benefit low-income individuals and residents of Equity Priority Communities. Evaluation efforts are critical for TDM programs to ensure these programs are advancing both our equity and sustainability goals. Travel analysis and leading with equity will advance city goals, knit together TDM efforts across the city, define TDM priority areas, and support regional programs and policies. Table 5 outlines the consistent peer city trip types that are likely to be established through data analysis.

Table 5: Possible Trip Types Focus Areas and Possible Details to Explore Through Data Analysis, Based on Peer City Research

POSSIBLE TRIP TYPES	POSSIBLE TDM PROGRAMS
Commuter Trips	• Existing and new large site/ employer program • Medium and small employers program • Performance standards • Reporting • Compliance requirements
Residential Trips	• Guidance to apply emerging mobility to maximize non-driving trips • Prioritization to support neighborhood-level trips, community needs, and equity • Informational efforts to increase awareness of options
Visitor Trips	• Informational efforts to increase awareness of sustainable modes for trips to popular destinations • Incentivize sustainable modes
Monitoring and Evaluating	• Targets or trends to track to understand TDM impacts • Metrics for comparing and evaluating pilot or small scale TDM programs • Standard data practices to establish baseline and compare efficacy between programs

Next Steps

Based on the findings of this white paper, recommended next steps are outlined below and include lead agencies. These items are intended to lay a foundation for long-term citywide and collaborative efforts to implement successful TDM programs and policies to achieve San Francisco's climate and long-range planning goals around sustainability, equity, economic vitality, safety and livability, and accountability and engagement.

1. Conduct a citywide analysis to define trip types, travel markets, or other travel information to identify concrete goals and targets and identify where TDM efforts are expected to have the biggest impact in achieving goals and targets.

   Lead: SFCTA
   Support: SFMTA

2. Establish a San Francisco travel information website with existing local and regional travel information with the ability to make adjustments over time that enable all residents, employees, and visitors to find relevant travel information quickly and easily.

   Lead: SFMTA
   Support: SFE, Planning

3. Create a framework and data reporting structure for ongoing, citywide monitoring of programs collectively at a city scale to track year over year impacts on TDM goal and targets.

   Lead: SFCTA
   Support: SFMTA

SFTP 2050: STRATEGIC TOPIC PAPER

Autonomous Vehicles

Introduction

The purpose of this white paper is to provide basic information about autonomous vehicles (AVs), current AV regulation and deployment, how AVs might be used in the future, the potential outcomes and impacts of their use, and the relevance of AVs to San Francisco's long -range planning efforts.

San Francisco has established policies, principles, and plans that help shape an understanding of how these vehicles may be used to complement the city's transportation system.

- **Transit First Policy:** The San Francisco Board of Supervisors adopted the city's transit-first policy in 1973. The policy prioritizes movement of people and goods with a focus on transit, walking, and biking, instead of private automobiles.
- **Vision Zero SF:** The City and County of San Francisco adopted Vision Zero as a policy in 2014, committing to build better and safer streets, educate the public on traffic safety, enforce traffic laws, and adopt policy changes that save lives.
- **Emerging Mobility Guiding Principles:** The Transportation Authority and the SFMTA adopted 10 Guiding Principles in 2018 related to emerging mobility services and technologies. These principles call for providers of new mobility options to support city goals and priorities. The principles also serve as a framework for evaluating these services and technologies, identify ways to meet city goals, and shape future areas of studies, policies, and programs.
- **ConnectSF:** The long-range, multi-agency process to build an effective, equitable, and sustainable transportation system for San Francisco's future. This process was rooted in community engagement to define long-range transportation vision, goals, strategies, and plans to support future implementation.
- **Climate Action Plan:** In 2021, the San Francisco Department of the Environment released the Climate Action Plan which charts a pathway to achieve net-zero greenhouse gas (GHG) emissions and works toward addressing racial and social equity, public health, economic recovery, resilience, and providing safe and affordable housing to all. The Plan's goal is to achieve net zero emissions by 2040; transportation goals include reaching 80% of trips taken by low-carbon modes, such as walking, biking, and transit, and having 50% of all registered vehicles in San Francisco by electric vehicles by 2030 and 100% of all registered vehicles in San Francisco be electric vehicles by 2040.

The future of AV technologies and business models is uncertain. How AVs are used in San Francisco and their potential impacts depends on the answers to key questions about their adoption and use on city streets, including:

- Will AV technology deliver the promised safety, accessibility, equity, system performance, and other benefits?
- How will AVs change travel patterns?
- For what purposes or uses will AVs be used?
- Will AV ride-hailing be economically viable as a service? Will AVs be available to all travelers?
- Will AVs be managed as fleets or individually owned? Will the costs of ownership limit private use to a luxury market, or will personal ownership be available to a broader market?
- Over what time frame will AV adoption occur and how widely will AVs be adopted?

Automated vehicle safety is regulated at the federal level, but operational regulations are primarily set at the state level. In California regulations are set by the California Department of Motor Vehicles (DMV) and the California Public Utilities Commission (CPUC). These agencies set regulations and issue permits that govern the number, time, and location of automated driving and its use for passenger services. San Francisco has little regulatory control over where, when, and how AVs may operate, despite significant testing on city streets.

However, through pilot programs and other efforts, San Francisco may be able to gain insights into how AV deployment may be shaped by local plans and policies (e.g., San Francisco's curb and parking management plans). These insights may help shape the near-term and long-term work program, policy development, and investment priorities of the SFCTA as well as other city agencies.

This white paper does not predict what a future with AVs will look like. Rather, it seeks to identify areas where AV technology and adoption of AVs may influence future transportation outcomes.

Definition of Autonomous Vehicles

There is no singular definition of what comprises an autonomous vehicle. Rather, vehicles are classified by the type and degree of autonomous features that they incorporate. The most cited set of autonomous vehicle definitions was developed by the Society of Automotive Engineers (SAE). The "Taxonomy and Definitions for Terms

Related to Driving Automation Systems for On-Road Motor Vehicles" (also known as the "SAE Levels of Driving Automation") was first published in 2014 and has been updated regularly. This definition identifies six levels of automation, from Level 0 (No Driving Automation) to Level 5 (Full Driving Automation). See Figure 1:[1]

- **Level 0 (No Driving Automation):** Vehicles are manually controlled, though features such as automatic braking may be present.
- **Level 1 (Advanced Driver Assistance):** Vehicles are manually controlled but include limited driver assistance such as lane monitoring and cruise control.
- **Level 2 (Advanced Driving Assistance):** Vehicles control steering, acceleration and braking, but a human must be prepared to take control at any time.
- **Level 3 (Conditional Driving Automation):** Vehicles have more extensive sensing and decision-making capabilities such as the ability to pass other vehicles, but a human still must be prepared to take control at any time.
- **Level 4 (High Driving Automation):** Vehicles are "self-driving" under most conditions, though a human (either on-board or remotely) may be able to take control of the vehicle if necessary.
- **Level 5 (Full Driving Automation):** No human attention required, and vehicles may not have human controls.

While there is no independent authority or regulatory body that identifies and confirms the levels of automation reflected in a vehicle or in its features, many vehicle models currently available to consumers include Level 1 and Level 2 automation features to support human drivers. There are no vehicle models available to consumers that have Level 4 or Level 5 autonomy features allowing them to be operated without continuous human driver attention and supervision. However, private companies are testing AVs on public streets that aim for Level 4 (High Driving Automation). These vehicles operate on city streets within certain constraints by location, time-of-day, weather conditions, and maximum speeds. These constraints are known as an operational design domain (ODD).

1 Society of Automotive Engineers "Taxonomy and Definitions for Terms Related to Driving Automation Systems for On-Road Motor Vehicles" (https://www.sae.org/standards/content/j3016_202104)

Figure 1: Levels of Driving Automation, Society of Automotive Engineers

Autonomous Vehicle Testing in San Francisco

In California, there are 49 companies testing AVs on city streets.[1] In San Francisco, there are three companies that actively test on city streets—Zoox, Waymo, and Cruise. Between November 2020 and November 2021, AVs reported having driven over 4 million test miles on public California roads. Over 78% percent of these miles were driven by Cruise and Waymo which test primarily in San Francisco.

Cruise and Waymo have received permits to operate AVs without safety drivers within an ODD approved by the California DMV. Both companies have also received additional permits from the CPUC to provide on-demand fared passenger service in San Francisco. Cruise is permitted to operate paid passenger service *without a safety driver* on public surface streets within designated parts of San Francisco with a maximum speed limit of up to 30 miles per hour, in clear weather, light rain, and light fog, between 10 PM and 6 AM. Waymo is permitted to provide public on-demand fared passenger service *with a safety driver* within parts of San Francisco and San Mateo counties, on public roads with a maximum speed limit of up to 65 miles per hour, in clear weather, light rain, and light fog.

1 https://www.dmv.ca.gov/portal/vehicle-industry-services/autonomous-vehicles/autonomous-vehicle-testing-permit-holders/

Extensive testing in San Francisco and recent events have highlighted that AV technology does not yet appear to be advanced enough for vehicles to operate effectively in complex environments like San Francisco. Some examples that have been reported in news media include failure to pull to the curb for passenger loading even when space is readily available, obstructing transit lanes for extended periods, obstructing general purpose lanes for extended periods, and failure to respond correctly to emergency vehicles. These events can slow traffic, block transit vehicles, and obstruct transit stops, block bike lanes, and obstruct pedestrian crossings, and delay emergency responses.[1]

Autonomous Vehicle Uses

AVs are being developed and tested to transport people and goods. When used to move people, AVs remove the need for a driver, present new transportation opportunities for individuals who have physical limitations that prevent them from driving, and make travel time more productive for travelers. If AVs are used for goods movement, long-haul (freight) and delivery services could be more efficient, convenient, and cost-effective for consumers and businesses. The following sections briefly summarizes potential uses and ownership models for AVs.

PASSENGER TRANSPORTATION

Personally Owned Autonomous Vehicles

Individuals and households may purchase autonomous vehicles to serve household transportation needs, from commuting and escorting children to school, to shopping and more. AVs might effectively serve as a household chauffer, picking up and dropping off different household members at different locations, rather than being used exclusively by one household member. AVs may be purchased to replace existing household vehicles or be purchased as an additional vehicle because of the convenience over human-driven vehicles.

Private Autonomous Vehicle Fleets

Private companies may use AVs to provide ride-hailing services to the public, following the model of transportation network companies (TNCs), such as Uber and Lyft. It is unclear whether a ride-hailing model will be economically viable outside of cities where development patterns and populations are less dense, travel times and distances are greater, and costs may be higher. It seems likely that in the near future, ride-hailing services will become the primary use case of private AV fleets. [2]

1 https://www.wired.com/story/cruise-fire-truck-block-san-francisco-autonomous-vehicles/

2 IATR Email 6/16/22

Public Autonomous Vehicle Fleets / Public Transportation

Some cities have begun testing the use of low-speed AV shuttles to provide public transit service through pilot demonstration projects. There are no fully functional, high capacity, public transit AVs that operate on public roads with mixed traffic available. The adoption of AVs for public transportation services may conflict with union labor and workforce arrangements.

GOODS TRANSPORTATION

Autonomous Vehicle Deliveries

Autonomous vehicles are being tested and developed to make long-haul and personal deliveries with freight vehicles, vans, and small delivery vehicles. The scale and types of vehicles that can perform delivery services may be expanded for a wider range of individual household and business deliveries. Deliveries may vary widely with respect to their size, frequency, timing, and location.

The freight industry is also testing AV trucks in states that permit this use. As technology advances, if more states allow for AV freight activities, AV freight may also be used to move goods between production, ports, airports, and distribution locations. Such uses may help address labor shortfalls in the freight industry, provide increased flexibility for long-haul goods movements, and reduce costs of delivery services. Many AV companies already invest in and develop autonomous trucking technology, in addition to passenger service.[1] However AVs weighing more than 10,000 pounds are currently not permitted on public roads in California.

Autonomous Vehicle Deployment and Market Adoption

Vehicles with Level 3 (Conditional Driving Automation) and Level 4 (High Driving Automation) are being developed by private companies but are not yet available to consumers in the United States. These vehicles are currently being tested and used in pilot projects in various cities around the country. SAE Level 3, 4 and 5 AV testing and deployments are permitted by the California Department of Motor Vehicles (CA DMV). The California Public Utilities Commission (CPUC) permits the use of AVs for passenger service.

Despite ongoing testing by the AV industry, the future of autonomous vehicles is unknown because it is unclear when the technology will be sufficiently safe and

1 IATR Email 6/16/22

technologically sound and stable to permit broad adoption. Vehicle ownership and adoption and business models will all play a significant role in the future of AVs.

Vehicle ownership and adoption is unclear because AVs could be purchased and operated by individuals or by companies that manage a fleet of vehicles to provide on-demand services. Different ownership models are likely to influence household trip-making with respect to the amount, location, and time of travel. AV delivery services could further impact household trip-making patterns.

The type and extent of AV adoption will be significantly influenced by the costs to consumers or businesses for use of these technologies. These costs will be a product of the business models developed and adopted by AV technology companies and manufacturers.

Business models, so far, have been public-serving deployments that are operated by private fleets for passenger travel. These services have initially launched as pilots with no fares charged for service. As of 2022, Cruise and Waymo are permitted to provide public, fared service in San Francisco, though this model may change as more companies are permitted to operate. At the time of writing, the data reporting required by the CPUC for paid passenger service does not include information on the actual fares paid for AV trips, so it is unclear what the costs to consumers to use AVs will be.

AV manufacturers may adopt business-to-consumer (individual ownership) or business-to-business (private companies own a fleet) models. It is likely that the different business models would lead to different costs for travelers. There is limited information on what the cost of vehicles with Level 4 or 5 driving autonomy may be. Some publicly available vehicles reportedly have the technological sophistication that approaches Level 3 capabilities; the costs of these vehicles are comparable to luxury vehicles, which suggests vehicle ownership may be out of reach for many households. Private vehicle insurance costs for AVs are also unknown and could further increase the costs associated with individual ownership, as insurance is typically one of the most expensive ongoing costs of car ownership.

Autonomous Vehicle Regulation

All vehicles, including AVs, are subject to a broad range of federal and state regulations in order to operate on public roadways. Federal authority primarily relates to establishing vehicle safety and emissions standards. State authority primarily addresses permitting of drivers and vehicles to operate on public roadways, carry passengers, establishing and enforcing traffic laws, and establishing liability and insurance

regulations. [1] State and local jurisdictions enforce traffic laws, though local jurisdictions, including San Francisco, have little control or oversight of AVs on their streets.

The city participates in rulemaking at the state and federal levels, primarily with the CPUC. The CPUC has an extensive, formal process to seek input. San Francisco has focused its comments on deployments and the need to consider impacts and ensure AV deployments support statewide goals about safety, accessibility, environment, and equity, and consider urban issues, traffic regulations, and data reporting.

Recently, the city has also begun to engage with the National Highway Traffic Safety Administration (NHTSA) as exemptions for AVs are being considered.

FEDERAL VEHICLE SAFETY STANDARDS

The Federal government is primarily responsible for establishing vehicle safety standards. The National Highway Traffic Safety Administration (NHTSA) is responsible for establishing and enforcing Federal Motor Vehicle Safety Standards (FMVSS), as well as monitoring, investigating, and communicating with the public about motor vehicle safety issues and defects. To date, NHTSA has not adopted regulations that set minimum safety standards for automated driving.

CALIFORNIA DMV PERMITTING OF AUTOMATED DRIVING ON PUBLIC ROADS

The California Department of Motor Vehicles (DMV) has authority to permit AVs to operate on public roads in California. DMV regulations require permit applicants to identify the Operational Design Domain (ODD) in which a vehicle can safely operate. An ODD may include limitations on the geographic area, roadway type, speed range, environmental conditions (weather; time of day) or other constraints within which the manufacturer expects the vehicle to operate safely. The DMV may revoke a deployment permit for operating outside the approved ODD.

The CA DMV has established three levels of AV testing permits[2]:

1. **Testing with a Driver** allows AVs to be tested with a safety driver present at all times. Statewide, there are about 50 companies with this permit.
2. **Driverless Testing** allows for AVs to be tested without a safety driver present. **Statewide**, there are 7 companies with this permit. Two of these are authorized to test without safety drivers in San Francisco.

1 National Highway and Traffic Safety Administration, Federal Automated Vehicles Policy, September 2016

2 https://www.dmv.ca.gov/portal/vehicle-industry-services/autonomous-vehicles/autonomous-vehicle-testing-permit-holders/

3. **Deployment** allow companies to make their AV technology commercially available. This type of permit may or may not include a requirement for a safety driver. A DMV deployment permit is required to deliver autonomous ridehail services to the public. The CA DMV has permitted 3 companies to commercially deploy AV services; 2 companies are in San Francisco—Cruise and Waymo.

However, in order to provide commercial passenger services to the public in AVs, these CA DMV deployment permits need to be complemented by a set of parallel permits issued by the CPUC.

CPUC PERMITTING OF PASSENGER SERVICE IN VEHICLE OPERATED BY AN AUTONOMOUS DRIVING SYSTEM

The CPUC oversees the deployment of AVs for the purpose of providing commercial transportation services to the public. The CPUC has adopted broad goals for AV deployment including protecting passenger safety, expanding the benefits of AV technologies to "all of California's communities," improving transportation options for all, particularly disadvantaged communities and low-income communities, and reducing greenhouse gas emissions, criteria air pollutants, and toxic air contaminants.[1] However, the CPUC does not specifically articulate how to define or achieve these broad goals and declined to specify performance targets in relation to these goals. Basic data is required as a permit condition (See Autonomous Vehicle and Trip Data Reporting section below).

The CPUC has established four levels of permitting[2]:

1. Test driving with passengers and safety drivers but without fares
2. Test driving with passengers without safety drivers and without fares
3. Commercial deployment to provide public fared AV passenger service with a safety driver
4. Commercial deployment to provide public fared AV passenger service without a safety driver

STATE AND LOCAL RULES OF THE ROAD, PARKING AND TRAFFIC REGULATIONS, AND CURB MANAGEMENT

Public roadways, and their associated "rules of the road" are typically under either state or local jurisdiction, depending on the facility. For example, traffic operations

1 Rulemaking 12-12-011 Decision Authorizing Deployment of Drivered and Driverless Autonomous Vehicle Passenger Service (https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M352/K185/352185092.PDF)

2 https://www.cpuc.ca.gov/regulatory-services/licensing/transportation-licensing-and-analysis-branch/autonomous-vehicle-programs

regulations for highway facilities are primarily established and enforced by state entities, while traffic regulations on surface arterials and local streets are generally established and enforced by local jurisdictions.

Curb access regulations are generally established at the local level. Curb access includes passenger loading, deliveries, etc., which are important given the anticipated primary use case of AVs for on-demand passenger service. In 2020, the SFMTA adopted a Curb Management Strategy, which seeks to address the increased demand for curb space that has been seen from the use of TNCs, on-demand package and food delivery services, and private transit such as employer shuttle buses.[1] Notwithstanding the City's effort to designate curb space for loading and unloading, the city has observed AVs picking up and dropping off passengers in the travel lane even when passenger loading zones are clearly marked and available. This practice may block general travel or bike lanes and obstruct the flow of transit and, depending on the location and timing, increase congestion, transit delays, and safety risks.

Recent incidents involving AVs on San Francisco streets have brought into focus a significant gap in the regulatory framework for enforcing traffic laws. The California Vehicle Code requires officers to provide a written citation to a driver and obtain a signature from the driver. This requirement assumes a human driver is present in the vehicle. As a result, law enforcement officers throughout the state are not able to cite any driverless autonomous vehicle for any moving violation.

VEHICLE EMISSIONS STANDARDS

Vehicle emissions standards are established by three agencies. At the federal level, the Environmental Protection Agency (EPA) establishes greenhouse gas emission standards. Also at the federal level, NHTSA establishes average fleet fuel economy standards, which influence emissions.

Uniquely among all states, California can also set vehicle emissions standards in part because it had established air quality regulations prior to the federal government establishing such standards. It is anticipated that many AVs would be electric vehicles, particularly given California's recent rules, first requiring all light-duty AVs with a model year after 2031 to be zero-emission vehicles, and then later all new car sales in the state to be zero-emission vehicles by 2035.[2]

1 https://www.sfmta.com/reports/curb-management-strategy

2 https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=202120220SB500; https://ww2.arb.ca.gov/news/california-moves-accelerate-100-new-zero-emission-vehicle-sales-2035

FEDERAL, STATE, AND LOCAL REGULATORY FEES AND TAXES FOR AUTONOMOUS VEHICLES

At present, the State of California is the only entity assessing regulatory fees on autonomous vehicles. These regulatory fees are: $1000 – $1500 for a company to register as a Charter-Party Carrier, with a $100 renewal fee per year.[1]

TRIP PRICING

The CPUC permits and oversees commercial AV passenger service in California. It is unclear whether the CPUC has the ability to establish rates for commercial AV (and TNC) service, though it has not yet attempted to establish rates for these services. However, the CPUC may have the discretion to do so, as they have with some of their regulated entities in other sectors.[2]

The CPUC's unregulated pricing of AVs (and TNCs) stands in contrast to the regulated pricing of taxis in San Francisco and in most other cities. As described by the National Academy of Sciences, taxi fare regulation "is designed to ensure predictability in the amount customers will be charged, to eliminate price gouging, and to ensure a reasonable return for owners and drivers."[3]

San Francisco does not have the authority to directly establish or constrain rates or prices for AV or TNC trips. However, as of January 1, 2020, San Francisco imposes a "Traffic Congestion Mitigation" excise tax of 1.5% to 3.25% on fares for rides originating in San Francisco that are facilitated by commercial ride-share companies or are provided by an autonomous vehicle or private transit services vehicle."[4] This excise tax was approved by San Francisco voters with the proceeds to be used to improve Muni transit service and capital improvements that promote users' safety in the public right-of-way.[5]

The Federal government does not regulate local transportation rates or pricing.

1 CPUC website (https://www.cpuc.ca.gov/-/media/cpuc-website/divisions/consumer-protection-and-enforcement-division/documents/tlab/av-programs/cpuc-av-program-applications-guidance-20211026.pdf)

2 California Public Utilities Code § 5381. (https://leginfo.legislature.ca.gov/faces/codes_displayText.xhtml?lawCode=PUC&division=2.&title=&part=&chapter=8.&article=3)

3 National Academies of Sciences, Engineering, and Medicine 2016. Between Public and Private Mobility: Examining the Rise of Technology-Enabled Transportation Services. Washington, DC: The National Academies Press. https://doi.org/10.17226/21875.

4 SF Treasurer's Office website (https://sftreasurer.org/business/taxes-fees/traffic-congestion-mitigation-tax-tcm#:~:text=The%20City%20imposes%20a%20Traffic,or%20private%20transit%20services%20vehicle)

5 https://sfelections.sfgov.org/sites/default/files/Documents/candidates/Nov2019_LT_D.pdf

AUTONOMOUS VEHICLE AND TRIP DATA REPORTING

The CPUC requires data to be reported by AV companies as a condition of the AV permitting process. Reporting is required quarterly and includes the following information:

- Trip request, pickup, and drop-off locations and times (at zip code and census tract level)
- Vehicle type
- Vehicle occupancy
- Vehicle miles traveled (without and with passengers)

It is unlikely that the required data will be enough for the CPUC or other parties to effectively assess AV performance in relation to the CPUC AV permitting goals. Additionally, based on San Francisco's experience with obtaining TNC data from the CPUC, there may be challenges with accessing AV data reported to the CPUC. TNCs are also regulated by the CPUC and required to report data, similar to what is required of AV permit holders. The CPUC's Administrative Law Judges having determined that TNC data are public records and must be disclosed (with redactions to remove detailed geographic locations, driver names, and other data items that are deemed potentially personally identifiable information). However, only a limited subset of the TNC data, which is of limited use, has been made available to the city or other public agencies by the CPUC via public record requests. The information that was released did not include key information that was determined to be public by the rulings. To date, the same data is also not included in AV data reports that have been shared publicly.

At the time of writing, San Francisco does not require any detailed AV reporting, and it is unclear under what authority San Francisco might assert such a requirement.

AUTONOMOUS VEHICLES AND LAND USE

The San Francisco General Plan guides land use in the city. The General Plan informs the Planning Code, which provides the practical guidance required to achieve General Plan and city goals through zoning and other regulations. Large fleets of electric AVs create a new demand for electric vehicle charging facilities to meet the demand of privately owned fleets. However, the Planning Code did not anticipate the land uses associated with the commercial use of electric vehicles, including those used for AV fleets.

Only recently, the Planning Code was amended to better classify land uses associated with EV charging and establish rules for their permitting. These updates were proposed by the San Francisco Planning Department in recognition that such land uses "do not fit neatly under existing Planning Code," and that it is important to have additional information to help guide land use development associated with AVs and

their potential impacts of loading, parking, and traffic.[1] The city's environmental review process for land use projects and policies, which is managed by the San Francisco Planning Department, may also provide a planning and implementation framework with which to assess and mitigate the impacts of AVs.

Potential Impacts of Autonomous Vehicles

The deployment and adoption of AVs could have a range of potential impacts on San Francisco's transportation system, built environment, and residents, workers, and visitors. If AVs become widely adopted, they may change individual travel behaviors and choices, street safety, effects on the environment, land use decisions, the availability of travel options to underserved communities, and public investments for transportation.

TRANSPORTATION AND SYSTEM PERFORMANCE

Roadway

Roadway performance is typically determined using metrics such as average speeds, vehicle miles of travel (VMT), and vehicle hours of delay (VHD). The extent to which AVs may impact roadway performance will be influenced by the business models developed and adopted by AV manufacturers and technology companies and the costs to consumers or businesses for use of these vehicles and technologies.

If AV trips simply replace Taxi and TNC trips, there may be a limited impact on roadway congestion. If AV trips replace private vehicle trips, there may be increased congestion from "deadheading" or driving that occurs between trips without a passenger. If AV trips replace walk, bike, and transit trips, or induce entirely new vehicle trips, AV trips may have a more significant effect on congestion. As with TNC trips, the timing and location of AV trips is important. AV trips that occur during peak periods in the densest parts of the city would likely have a greater effect on congestion than AV trips that occur during off-peak periods in less dense areas.[2] In theory, AVs could decrease congestion by inducing mode shift to priority modes (e.g., biking, transit), by providing first- and last-mile connections to transit services, or by reducing auto ownership levels and thus incentivizing people to make more transit, bike and walk trips. In addition, if the vehicle passenger occupancies of AVs are higher than typical vehicle trips as a result of "ridesplitting", where AVs are shared and serve multiple passenger trips concurrently, then the overall number of vehicle trips may be reduced.[3]

1 https://sfplanning.org/project/transportation-network-companies-and-land-use-planning#info

2 Erhardt, G. D., Roy, S., Cooper, D., Sana, B., Chen, M., & Castiglione, J. (2019). Do transportation network companies decrease or increase congestion? Science Advances, 5(5), eaau2670. https://doi.org/10.1126/sciadv.aau2670

3 Erhardt, G. D., Roy, S., Cooper, D., Sana, B., Chen, M., & Castiglione, J. (2019). Do transportation network companies decrease or increase congestion? Science Advances, 5(5), eaau2670. https://doi.org/10.1126/sciadv.aau2670

However, AVs may also increase congestion if their convenience causes a walk, transit, or bike trip to shift to being an AV trip, or if the availability of AVs induces travel that may not have otherwise occurred. The impacts of on-demand AV passenger services may be similar to the impacts of TNCs. Research has shown that between 43% and 61% of TNC trips substitute for transit, walk, or bike travel or would not have been made at all.[1] AV passenger pick-up and drop-off activity may also result in increased congestion, transit delays, and safety challenges by disturbing the flow in curb lanes or traffic lanes. Out-of-service miles (or "deadhead" miles) resulting from AVs repositioning themselves to more optimal locations for getting new passengers, or from driving to pick up passengers who have reserved rides (whether single passenger or shared), also increases the amount of vehicular traffic and congestion.[2]

Transit

If AVs are used as private fleets for purpose of on-demand passenger travel, they could increase transit ridership by providing first- and last-mile connections to transit services. However, in San Francisco, despite the presence of an extensive, high-frequency transit system and the availability of TNCs to provide similar first- and last-mile service, there were no observable increases in transit usage prior to the COVID pandemic. Rather, the presence of on-demand ride-hailing appeared to lead to reduced transit ridership after accounting for other factors.[3]

Alternatively, rather than serving transit first- and last-mile access, AVs might be deployed as private fleets that could provide shuttle or fixed-route services that resemble more traditional transit service. These services might increase the overall number of transit-like trips occurring in San Francisco. However, these services might compete with and draw riders away from existing public transit services.

Finally, AVs could be used by public transit agencies directly, though public transit applications of AVs to date have focused on low-speed shuttles or the use of passenger-sized vehicles within limited operating constraints. Any public transit use of AVs would require them to be accessible to people with disabilities and meet other regulatory standards.

EMISSIONS AND THE ENVIRONMENT

The most significant environmental impacts from AVs would likely result from emissions and particulate matter. The AVs operating and testing in San Francisco today are a mix of battery electric (zero-emissions) vehicles and hybrid-electric vehicles, and it is anticipated that in the future AV fleets will be mostly or entirely electric. Even zero

1 Ibid

2 Ibid

3 Erhardt, G.D., Mucci, R.A, Cooper, D., Sana, B., Chen, M., & Castiglione, J. (2022). Do transportation network companies increase or decrease transit ridership? Empirical evidence from San Francisco, Transportation volume 49, pages 313 – 342

emission vehicles produce particulates from brakes and tires, as well as other lifecycle emissions arising from vehicle manufacturing, distribution, and disposal. Other AV models rely on traditional internal combustion engines, and these AVs would produce many emissions including greenhouse gases such as carbon dioxide, methane, and nitrous oxide, as well as particulate matter.

In addition, if the availability of AVs results in an overall increase in vehicle trips and VMT on the roadway network due to mode shifts from transit, walking, and biking, and from dead-heading, this additional traffic would likely lead to additional emissions from the general fleet, which is still dominated by internal combustion engines, as these vehicles spend more time idling and driving at speeds that produce greater emissions.

PUBLIC SAFETY

Public safety impacts of AVs in San Francisco should be considered from the perspectives of those traveling in AVs (whether individually owned or as fleets) and other users of the public right-of-way, including pedestrians, transit riders, drivers, and bicyclists.

AV passengers might be impacted by on-board incidents or failures. In the context of shared, on-demand AV services that operate without a driver, passengers may be subject to assault or harassment by other passengers. For other road users, collisions between AVs with other vehicles or people may cause injuries and confusion due to lack of education or lack of general awareness on how to interact with a driverless vehicle. Excessive speeds are a key factor in serious crashes, and operational constraints on AVs speeds may help mitigate the frequency and severity of these incidents, though slow speeds might also lead to more risky maneuvers by other non-AV vehicles.

Additionally, as stated previously, if AVs are not able to pull to the curb for loading activities and stop in the travel lane, there are risks that transit reliability and street safety could be impacted.

EQUITY

Prior Transportation Authority reports have noted that, "It is important to ensure that all areas of the city have access to transportation alternatives, while also acknowledging that different communities may have different needs and abilities to pay for mobility services."[1] Whether or not the availability of AVs and AV services in San Francisco will be equitable depends on how the AV market and technologies evolve in the coming years, as well as how decision-makers choose to monitor and enforce AV service provision.

It appears most likely that widespread deployment and availability of AVs for passenger service will be through private fleets. If so, it is important to ensure that there are no

1 San Francisco County Transportation Authority. 2017. "TNCs Today: A Profile of San Francisco Transportation Network Company Activity." https://www.sfcta.org/sites/default/files/content/Planning/TNCs/TNCs Today_112917.pdf

systematic biases in AV service provision, but rather that residents and visitors in all city neighborhoods are able to use AVs, regardless of their income, race/ethnicity, ability/disability, age, access to or comfort with smartphone technology, or other factors. A recent Bay Area travel survey[1] revealed that in San Francisco, TNCs are used more frequently by wealthier and younger residents.

Disabled access is another critical equity concern. At present, no AV companies operating or testing in San Francisco are using wheelchair accessible vehicles (WAVs). Some companies have announced plans to develop WAVs. While the CPUC's "Proposed Decision Authorizing Deployment of Drivered and Driverless Autonomous Vehicle Passenger Service" establishes four goals including expanding the "benefits of AV technologies to all of California's communities" and improving "transportation options for all, particularly for disadvantaged communities and low-income communities," the decision declines to define accessibility or to set any specific targets or benchmarks for accessibility.[2] Because on-demand AV ride-hailing is so similar to on-demand TNC ride-hailing services, the TNC example is instructive. TNCs have not proactively provided WAV service, and it is only with significant expenditure of public fees collected through the "Access for All" legislation that TNCs have begun to provide these services.[3]

An additional concern may be the racial or other biases embedded, implicitly or explicitly, in the algorithms used to support both AV technologies as well as ride-hailing technologies. For example, research suggests that several models used for object detection by AVs show "uniformly poorer performance of these systems when detecting pedestrians" with the darkest skin types.[4] Many studies have shown similar patterns with respect to facial recognition. Other research has suggested ride-hailing apps may also have racial biases with respect to pricing.[5]

Finally, if AV manufacturers pursue a business model in which AVs are personally owned by households, these vehicles may be only available to more affluent households and individuals, potentially exacerbating inequitable patterns and impacts on mobility and accessibility for lower-income communities.

1 Bradley, M., E. Greene, B. Sana, D. Cooper, J. Castiglione, S. Israel and C. Coy. Results of the First Large-scale Survey of TNC Use in the Bay Area. Presented at 100th Annual Meeting of the Transportation Research Board, Washington, D.C., 2021

2 Decision Authorizing Deployment of Drivered and Driverless Autonomous Vehicle Passenger Service

3 https://www.cpuc.ca.gov/regulatory-services/licensing/transportation-licensing-and-analysis-branch/transportation-network-companies/tnc-accessibility-for-persons-with-disabilities-program

4 Wilson, Hoffman, Morgenstern, "Predictive Inequity in Object Detection" (https://arxiv.org/pdf/1902.11097.pdf)

5 Pandey & Caliskan, "Disparate Impact of Artificial Intelligence Bias in Ridehailing Economy's Price Discrimination Algorithms" (https://arxiv.org/pdf/2006.04599.pdf)

EMPLOYMENT

AV technology may directly replace drivers employed in passenger or goods transport. New AV passenger or delivery services may also lower earning potential for drivers through competition. New jobs may also be created developing or supporting the deployment of AV passenger or delivery services.

Recommendations and Next Steps

Given continued uncertainty about the deployment of automated driving technologies, it is premature to build investment plans on expectations for the industry. The SFTP identifies the need to continue working across city agencies and with private providers to bring AVs and other new mobility options to support established polices, goals, and priorities. Based on the potential risks that AVs could have on the local transportation system and the lack of local authority to regulate these vehicles at a local level, the following efforts are suggested for action or further study as potential ways to mitigate negative impacts.

- **Continue to participate in AV regulatory proceedings** at the state and Federal levels that directly affect the deployment of AV ride-hailing in San Francisco.
- **Continue to engage with AV developers, providers, and other stakeholders** to provide decision-makers with insight into the alignment between AV services and City and County transportation policies and goals.
- **Collaborate with federal and state agencies** to establish data collection and reporting requirements that allow for effective evaluation of effects of automated driving in relation to federal, state, and local policy goals. Collaborate with other levels of government to use resulting analysis to inform effective policy and/or regulation.
- **Advise decision-makers on the AV impacts** with information that will help guide regulation, enforcement, and collaboration efforts. Through these efforts, it may be possible to identify mutually beneficial operating environments to advance the long-term transportation goal for a more efficient, equitable, and sustainable transportation system.

- **Identify, codify, and implement policies and investments that help mitigate potential increases in vehicle travel.** The state, region, and city are studying means-based pricing strategies to make more efficient use of the transportation network.[1] With the potential increase in vehicle travel associated with AVs, the city should continue to advance these efforts. Congestion pricing and other pricing-based strategies such as VMT fees may offer the most efficient means of achieving desired outcomes and may be complemented by on-street priority for more sustainable modes (walking, biking, and public transit), and curb management strategies.

As the SFTP is updated regularly, San Francisco has future opportunities to update and revisit our assumptions and knowledge about AV technologies, market adoption and potential impacts, and the implications for long-term planning efforts.

1 See the Road User Charge White Paper