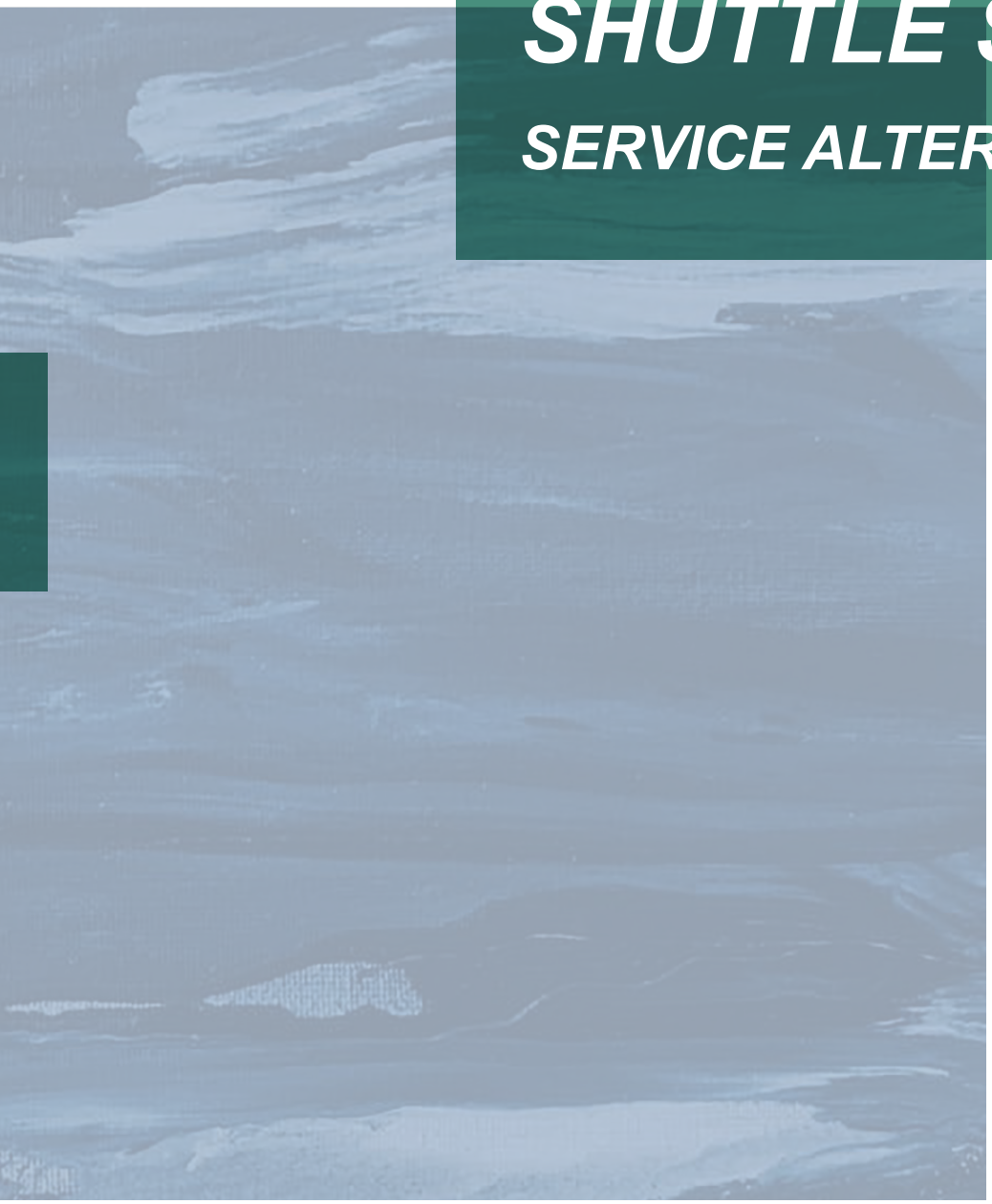
CITY OF MOUNTAIN VIEW SHUTTLE STUDY

SERVICE ALTERNATIVES



CITY OF MOUNTAIN VIEW

CONTENTS

Service Alternatives 1
Appendix A A.1
Appendix B B.1

SERVICE ALTERNATIVES

Introduction

The City of Mountain View has partnered with Google since 2015 to provide fare-free service to Mountain View residents, employees, and visitors on the Community Shuttle. Beginning in June 2020, Google will no longer operate the shuttle but has agreed to fund the service through 2024. Additionally, VTA recently implemented the 2019 New Transit Service Plan, which affected some VTA routes serving Mountain View. The City is also working toward bold reduction targets for greenhouse gas emissions that will require a significant decrease in the mode share of single-occupancy vehicle (SOV) trips.

These changes provided the City with an opportunity to evaluate the Community Shuttle and plan for its future as a component of a multi-agency multi-modal transportation network. The City of Mountain View Shuttle Study is comprised of three phases. The first was a study of existing transit service and market conditions, as summarized in the Existing Conditions Report. The second phase developed strategies to improve intracity service and intercity connections to meet travel demand in the short and long terms. These service strategies were included at the end of the Existing Conditions Report and are integrated into this report as well. This third and final phase employs these strategies to develop service alternatives for the Mountain View City Council to consider for implementation. This report presents and summarizes those service alternatives.

Summary of Existing Conditions

The analysis of existing transit conditions was designed to answer a few key questions:

- Where do people live? Where are they trying to go and when?
- Where are populations who are most likely to rely on transit living?
- How effective are existing transit options at serving these trips and populations?
- How well does the community perceive transit to be serving them and do they use it?

A key component of the existing conditions analysis was identifying the areas where transit is most likely to attract riders and serve the community. Market identification considers major employers, shopping centers, schools, and other trip generators. Another indicator of transit usage is population and demographic information. The following data (all measured in persons per acre) were aggregated to create a composite transit propensity map:

- Population Density
- Low-Income Household Density
- Zero-Vehicle Household Density
- Youth (Populations Age 18 and Under) Density
- Seniors (Populations Age 65 and Over) Density

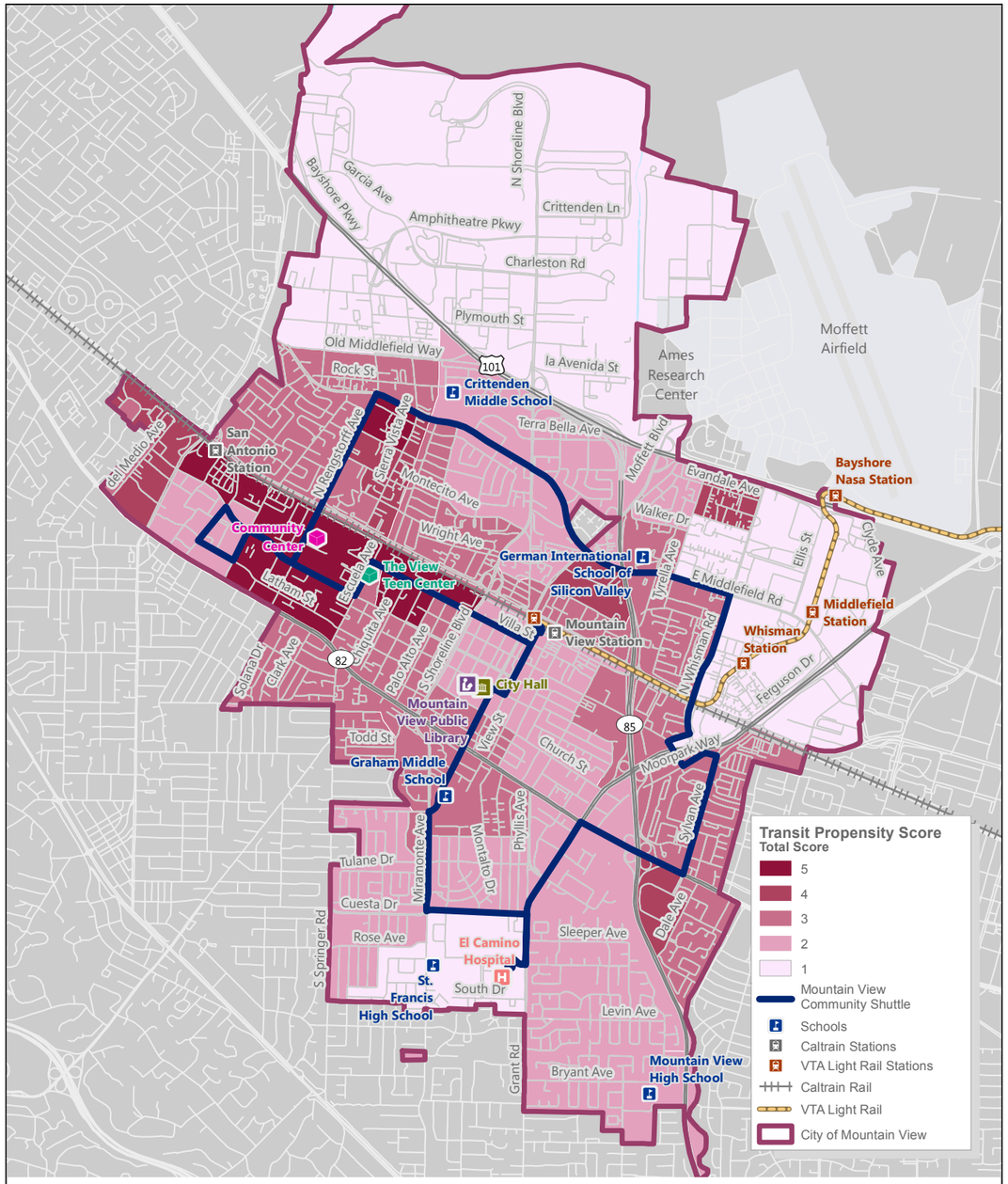
The transit propensity index indicates that the greatest need for transit (as measured by these factors) is concentrated primarily on the western side of Mountain View, near the San Antonio Station and the Census block groups southeast of the Station (where the Community Center and Teen Center are located), along the Caltrain line. The current Mountain View Community Shuttle travels through and stops in these areas. (See Figure 1.)

The Existing Conditions Report also included an evaluation of current service performance. The Community Shuttle's alignment successfully links key trip generators throughout the community, and service productivity (passenger boardings per service hour) was stronger than any of the VTA routes that serve Mountain View (Routes 22, 32, 34, 35, 40, 81, and 522). Phase 1 of the Shuttle Study included a community survey to gauge community perceptions, demand, and usage of the Community Shuttle.

According to survey respondents, two of the greatest deterrents to using the Community Shuttle are the limited service span and a service frequency of 30 minutes. The survey indicated the Shuttle would need to operate at least every 15 minutes to be considered attractive to a plurality of respondents (47 percent). With a 10 AM – 6 PM service day, the Community Shuttle does not serve those traveling during traditional morning commute hours (6 AM – 9 AM) or commuters arriving in Mountain View after 5:30 PM. If a commuter cannot use the Community Shuttle for one end of their daily commute, they are unlikely to use it for the other end. Students are also unable to take the Community Shuttle to school in the mornings, and residents are unable to use the Shuttle for non-work trips in the evenings.

The service alternatives presented in this report were developed based on Phase 2 service strategies and goals identified in the existing conditions analysis. Alternatives are presented in the following sections with the related strategy or goal.

FIGURE 1: TRANSIT PROPENSITY MAP



City of Mountain View - Transit Propensity Score

0 0.25 0.5 1 Miles

Improve Community Shuttle Through Service Changes

There are many approaches to improving Community Shuttle service, including changes to service design, operations, administration, and funding. This section addresses service and operational alternatives to provide better service to existing riders and attract more riders by better meeting community travel demands.

Extend Hours of Service (Span)

Extending the hours of service on the Community Shuttle opens up transit as a potential alternative to more Mountain View trips (those occurring before 10 AM and after 6 PM). A longer span also helps the Community Shuttle operate more effectively as a first/last mile connection to other regional services (Caltrain, VTA), which have significantly longer service spans than the Community Shuttle.

The other key service provider for local trips in Mountain View is MVgo, operated by the Mountain View Transportation Management Association (MVTMA). Its current span is peak-only, from 6:45/7:15 AM to 10:15/10:45 AM in the morning peak and 3:00/3:45 PM to 7:45/8:30 PM in the evening peak. For these two services to function as complementary, the Community Shuttle should at least cover the same span as MVgo, if not more (keeping mid-day service). Service span alternatives are summarized in Table 1.

EXPAND SERVICE HOURS ON WEEKDAYS

The current 10 AM – 6 PM all-week service span for the Community Shuttle does not address both ends of weekday work trips, with most traditional commuters needing to reach work before 9 AM. Most people will use the same mode for both their home-based-work trip and work-based-home trip. If the Community Shuttle cannot capture both ends of that trip, it will not be a feasible option for commuters. Earlier morning and later evening service would help accommodate not only traditional commute trips, but also school hours for student trips and more non-work trips. For example, many activities at the Senior Center begin before 10 AM.

TABLE 1: SUMMARY OF SERVICE SPAN ALTERNATIVES

Service Span Alternatives	Current		Proposed		Additional Daily Revenue Hours	Additional Daily Vehicles Required	Additional Annual Operating Cost
	First Trip Start Time	Last Trip Start Time	First Trip Start Time	Last Trip Start Time			
Expand service hours on weekdays	10:00 AM	5:00 PM	7:00 AM	6:30 PM	18	0	$624,240[1]
Expand service hours on weekends	10:00 AM	5:00 PM	8:00 AM	7:00 PM	8	0	$119,680

1 Costs are based on the current cost of operating the Community Shuttle. Based on comparative costs for other services in the region these appear to represent the high end of operating costs.

EXPAND SERVICE HOURS ON WEEKENDS

The current service span also limits the utility of the Community Shuttle as a first/last mile connection for regional trips over the weekend. If a Mountain View resident makes a trip into San Francisco on a Saturday night, Caltrain span (operating Northbound until 10:50 PM and Southbound until 1:30 AM) covers that trip, but if the first/last mile connection on the Community Shuttle isn't available after 6 PM, that may be a deterrent to using transit. Even if there are not enough resources to match the Caltrain span, extending service by even a few hours will capture more trips.

There are advantages and drawbacks to consider before implementing the service span alternatives, including:

- **Pros:** Service becomes more useful for more trip purposes. People can use the Shuttle to travel to work and school earlier in the morning and for entertainment and journeys home from work in the evenings. Extending service span also does not require purchasing additional vehicles.
- **Cons:** This expanded span may still not be early enough for commuters who spend over an hour on Caltrain, such as people working in the heart of San Francisco.

Improve Frequency

Frequency is the number one factor that attracts new riders to use transit. With 30-minute service, riders must depend on the trip schedule and plan their travel around when the bus operates. As service frequency increases, average wait times decrease, and riders can more easily spontaneously show up at the bus stop and wait for the next trip. Since a larger percent of the population wants to just show up and ride rather than plan around a schedule, increasing frequency from every 30 minutes to every 20 or 15 minutes is expected to significantly grow ridership.

If there were no resource constraints, 15-minute frequency on both weekdays and weekends optimizes the Community Shuttle for customer convenience and ease of use. However, the Community Shuttle operator will most likely need to set priorities for service improvements by either limiting which days (weekday vs. weekend) and which routes (clockwise vs. counter-clockwise) or route segments receive additional frequency investment. The degree of frequency improvement (10 minutes better vs. 15 minutes better) must also be considered. Alternatives are outlined in Table 2.

TABLE 2: SUMMARY OF FREQUENCY ALTERNATIVES

Frequency Increase Options	Current Frequency (minutes)	Proposed Frequency (minutes)	Additional Daily Revenue Hours	Additional Daily Vehicles Required	Additional Annual Operating Cost
Increase weekday service to 20 minutes	30	20	18	2	$752,240
Increase weekday service to 15 minutes	30	15	34	4	$1,435,120
Increase weekday service to 15 minutes between San Antonio Center and Mountain View Caltrain only	30	15 (partial route) 30 (full route)	8	1	$341,440
Increase weekend service to 30 minutes	60	30	16	2	$239,360

NOTE: ADDITIONAL ANNUAL OPERATING COST IS INCLUSIVE OF THE ANNUAL COST OF LEASING ADDITIONAL VEHICLES.

There are advantages and drawbacks to consider before selecting an alternative service frequency, including:

- **Pros:** Increasing frequency is proven to increase ridership. Reduced wait times increase transit's attractiveness, especially for shorter trips taken on community circulators.
- **Cons:** The cost of increasing frequency is significantly higher than expanding span or changing the route alignment. Increasing frequency requires acquiring new vehicles, adding capital cost. Productivity may decrease if ridership does not increase with direct proportionality (1:1) to the amount of additional service provided.

Extend Hours of Service and Improve Frequency

Arguably the service change with the greatest impact would be improving both service span and service frequency. This approach is, of course, costly but the most likely to grow ridership on the Community Shuttle. Estimated resources for joint improvements are summarized in Table 3.

TABLE 3: SUMMARY OF COMBINED FREQUENCY-SPAN IMPROVEMENT RESOURCE REQUIREMENTS

Combined Frequency-Span Alternative	Proposed		Additional Daily Revenue Hours	Additional Daily Vehicles Required	Additional Annual Operating Cost
	Frequency	Span*			
Weekday - Expand span and increase frequency to 20 minutes	20	7:00 AM – 6:40 PM	34	2	$1,307,120
Weekday – Expand span and increase frequency to 15 minutes	15	7:00 AM – 6:45 PM	50	4	$1,990,000
Weekday – Longer service span, add 15-minute service during peak commute times (6-9 AM, 2-6:45 PM)	15 (peak) 30 (off-peak)	6:00 AM – 6:45 PM	50	4	$1,990,000
Weekday – Expand span and increase frequency to 15 minutes between San Antonio Center and Mountain View Caltrain only	15 (partial route) 30 (full route)	7:00 AM – 6:30 PM	30	1	$303,360
Weekend – Expand span and increase frequency to 30 minutes	30	8:00 AM – 7:00 PM	32	2	$606,720

*SPAN REPRESENTS THE STARTING TIME OF THE FIRST AND LAST TRIP.

Adjust Route Alignments to Reduce Redundancies and Complement Other Services

Redesigning the Community Shuttle alignment is a cost-effective option to improve productivity, attract new riders, and/or reduce redundancies between the Community Shuttle and other transit operators in Mountain View. One such redundancy is the current Community Shuttle route deviation to serve El Camino Hospital via Cuesta Dr. and Miramonte Ave. This overlaps with two other services: VTA Route 51 and a free public shuttle operated by El Camino Hospital. This segment of the Community Shuttle route accounts for only 9 percent of total ridership while using 25 percent of the route's resources (15 minutes of the 60-minute schedule). While multiple service options to critical services is ideal, these Community Shuttle resources could be reallocated to other areas without service or with higher demand while two service options maintain access to El Camino Hospital.

REALIGNMENT ALTERNATIVE 1

One option for reallocating the resources from the El Camino Hospital deviation is adding a loop via North Whisman, Fairchild, and Ellis Street to add service to major employers, future residential projects and Middlefield Station. Service would continue along El Camino Real between Castro and Grant Rd. instead of deviating to serve El Camino Hospital. See Figure 2.

Alternative 1 has both advantages and drawbacks, including:

- **Pros:** New segment provides additional connection point to VTA Orange Line light rail (Middlefield Station). Added service segment also serves several employers, including multiple Google campuses, and planned future residential development. There are also several electric vehicle charging points along the proposed loop that could potentially be used for Community Shuttle charging. Improves access to Caltrain, senior and teen centers from areas along El Camino Real south of Castro.
- **Cons:** Alignment change would eliminate Community Shuttle service to El Camino Hospital, Cuesta Park, El Camino YMCA, direct stop to Graham Middle School, and a Cuesta Dr. stop proximate to St. Francis High School.

REALIGNMENT ALTERNATIVE 2

An alternative allocation of resources from discontinuing the El Camino Hospital deviation would alter the route to create two loops, connected by the Villa St. segment in Downtown Mountain View (between Moffett and Shoreline Blvds.). Service would still be bi-directional, but the Villa St. segment would be served twice on the Red Line (clockwise route) and twice on the Grey Line (counter-clockwise route), rather than only once on each line in the current alignment. Service would continue along El Camino Real between Castro and Grant Rd. instead of deviating to serve El Camino Hospital. The turn-by-turn alignment for Alternative 2 is shown in Figure 3.

Alternative 2 has both advantages and drawbacks, including:

- **Pros:** This alignment Improves access to Caltrain, VTA light rail and Downtown Mountain View from areas north of the Caltrain Line. It provides more miles of residential collection points as well as service to retail destinations on Moffett and the Social Security office and Safeway grocery off Shoreline. Improves access to Caltrain, senior and teen centers from areas along El Camino Real south of Castro.
- **Cons:** Alignment change would eliminate Community Shuttle service to El Camino Hospital, Cuesta Park, El Camino YMCA, direct stop to Graham Middle School, and a Cuesta Dr. stop proximate to St. Francis High School. Creates deviation/longer ride for customers traveling from one end of Middlefield Rd. to the other.

COMPARING ALTERNATIVE ALIGNMENTS

Both realignment alternatives are cost neutral, not requiring any additional operating or capital costs since resources will be reallocated from the El Camino Hospital deviation. Alternative 1 provides more "last mile" connection points (employment destinations) and expands the overall geographic extent of the Community Shuttle service. Alternative 2 provides more "first mile" points (residential origins) and additional service to Downtown Mountain View, prioritizing connections to Mountain View Transit Center/Caltrain Station. Both introduce some overlap with existing VTA service while eliminating overlapping service to El Camino Hospital.

SERVICE TO NEW RESIDENTIAL DEVELOPMENT

The North Bayshore and Whisman Specific Plans anticipate significant new housing in areas that are currently exclusively commercial. While Realignment Alternative 1 could serve potential development in the Whisman area, the Community Shuttle does not serve the North Bayshore area except for weekend service to the movie theaters. One option for serving new residential development in these areas would be expansion of MVgo service. Beginning in April 2020, MVgo will add a route serving residential developments on San Antonio Road and El Camino Real. Most MVgo service has been designed to serve employers who belong to the MVTMA. However, if the City of Mountain View continues to mandate that new multi-unit residential developments become members of the MVTMA, funding could be available to expand the service span to serve more residential areas.

FIGURE 2: CURRENT SERVICE COMPARISON TO REALIGNMENT ALTERNATIVE 1

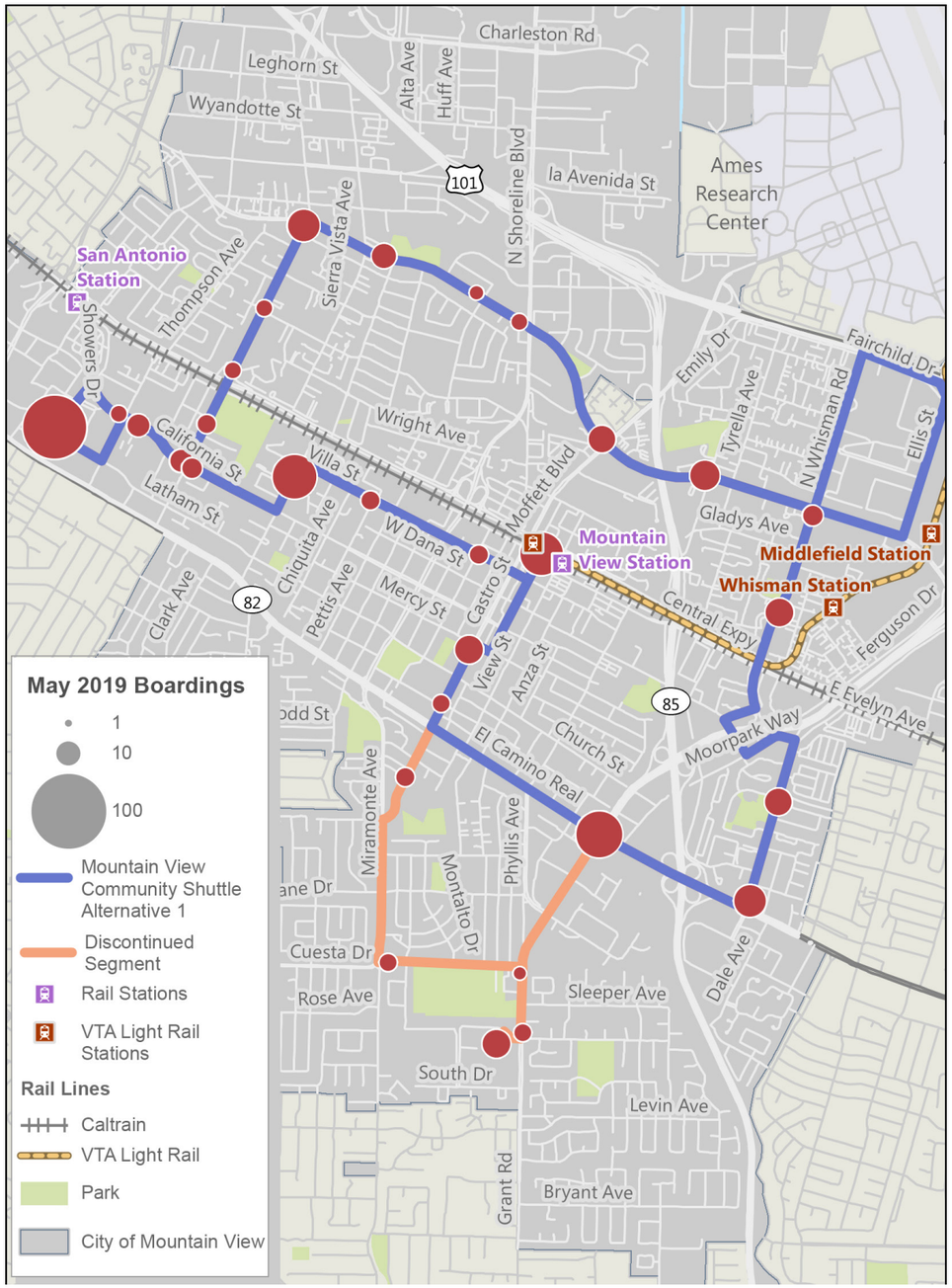
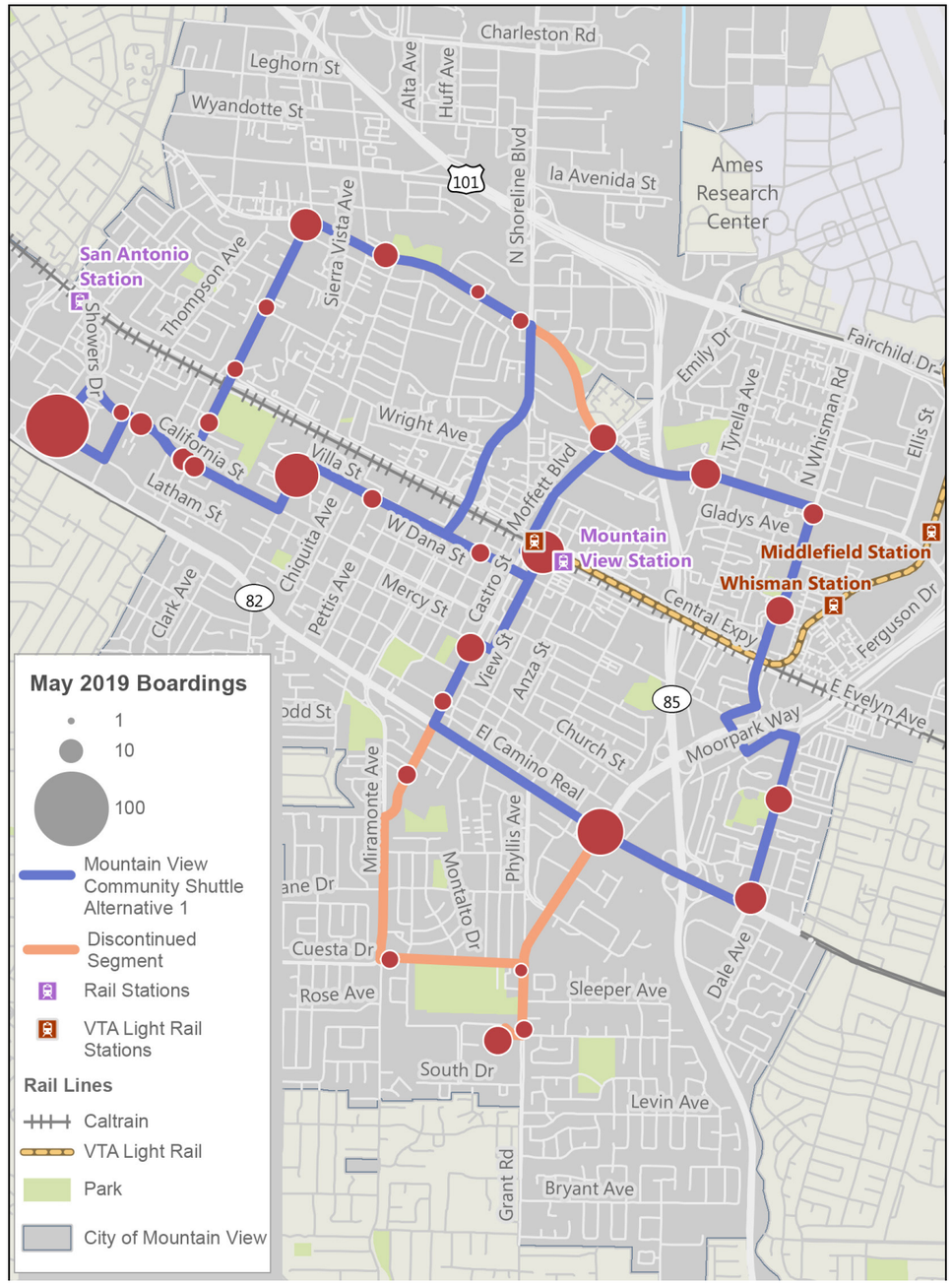


FIGURE 3: CURRENT SERVICE COMPARISON TO REALIGNMENT ALTERNATIVE 2



Ensure First/Last Mile Connections to Regional Service

In addition to internal Mountain View travel, an optimized Community Shuttle should provide first/last mile connections to regional transit services. Demand for those regional services is expected to grow in the coming years. As Caltrain moves toward complete electrification, service is anticipated to be more frequent and provide faster trips under the Caltrain Modernization Program (CalMod). These improvements will likely increase demand for service at the Mountain View Caltrain Station, where parking is already constrained. The San Antonio Caltrain Station only has limited parking shared with a housing development and thus faces a similar challenge.

Providing additional parking capacity is costly and continues facilitating personal vehicle trips (including SOV trips). Reduction of SOV trips is a key component to Mountain View's climate action planning efforts. An increased demand for Caltrain positions the City of Mountain View to demonstrate leadership in first/last mile connections to a robust regional transit network. As alternatives to the Community Shuttle or supplemental service, VTA trippers and On-Demand (OD) services are options for providing these first/last mile connections.

VTA Peak Trippers

VTA routes serving the Mountain View Transit Center operate approximately every 30 minutes, or two trips per hour. By contrast, Caltrain provides four trains per hour during weekday peak hours (though arrival and departure times are not always evenly distributed within the hour). VTA Orange Line light rail provides service from the Mountain View Transit Center to employment destinations in Sunnyvale and San Jose every 15 minutes. By investing in additional trips on select VTA bus routes connecting to Caltrain and VTA light rail, Mountain View can offer an alternative to driving to rail stations. VTA Bus Routes 51 and 52 are contenders for peak trippers.

Route 51 operates between NASA Ames Research Center and West Valley College. The segment between Mountain View Transit Center and Grant and Fremont falls mostly within the Mountain View city limits and is within walking distance of most residential areas in the southwest quadrant of the city. (See area between Timepoints B and F in Figure 5.) The segment north of the Caltrain tracks (between Timepoints A and B in Figure 5) is also served by VTA Route 21, providing four trips per hour during peaks.

Route 52 operates between Mountain View Transit Center and Foothill College via El Monte. (See Figure 6.) As there are no feasible points for turning around the bus near the Mountain View – Los Altos boundary, the entire route would be considered for additional trips.

To operate approximately 15-minute peak-hour service on these two routes would require three buses providing 14 hours of additional service per day. Based on VTA 2020 marginal costs, if the City were to subsidize this extra service, it would cost approximately $429,000 per year.

If the Community Shuttle span of service is increased to cover the peak hours and the existing route alignment is not modified, adding service to Route 51 could be duplicative, although the shuttle does not serve neighborhoods near Mountain View High School. Adding service to Route 52 only would require two additional buses or about nine additional hours at an annual cost of $276,000 (based on the same VTA 2020 marginal costs).

FIGURE 5: MAP OF VTA BUS ROUTE 51

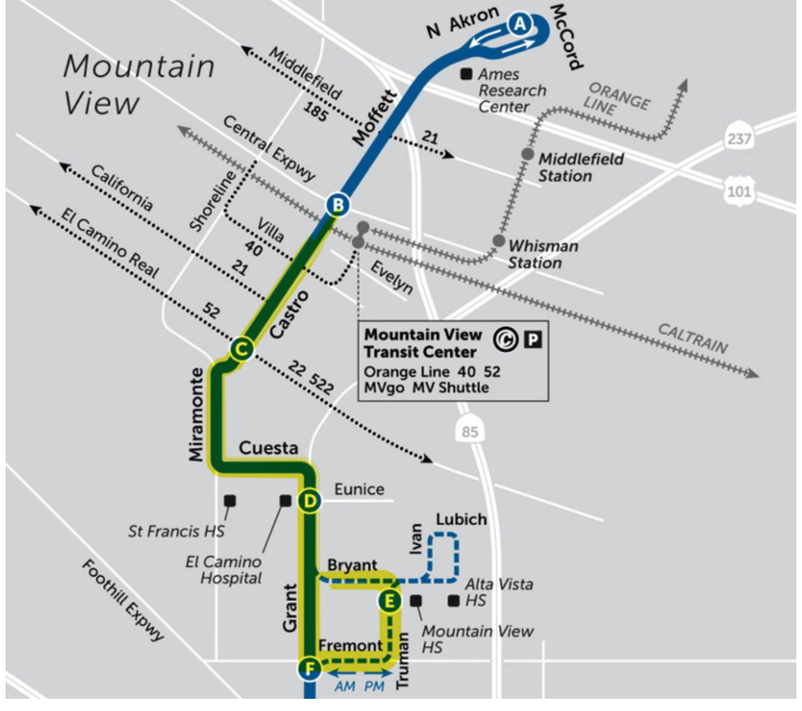


FIGURE 6: MAP OF VTA BUS ROUTE 52

On-Demand (OD) Service

OD service as a first/last mile alternative is growing increasingly popular among transit agencies and communities. OD pilot projects typically use small vehicles and offer shared rides to customers who have requested service through an app/website/digital platform. Although services like this, traditionally called dial-a-ride, have been around for over 50 years, the use of mobile apps has significantly improved the customer experience by enabling riders to request a trip at the time they want to travel rather than having to make reservations up to 24 hours in advance.

OD service has multiple benefits from the customer perspective. Riders can request trips when they want to travel rather than working around the schedule of a fixed-route bus or calling a day in advance. Some OD services also offer curb-to-curb service, picking up customers at any point instead of an operator-designated bus stop or pickup location. Though more convenient for consumers, for service providers, OD models are generally less operationally efficient than fixed-route service. OD services still require paying a driver to sit in a vehicle all day, regardless of demand, and accrues more deadhead time and mileage between passenger trips. The vehicles are typically vans or very small buses, limiting the number of passengers per trip.

Appendix A provides greater detail on OD service models and includes eight case studies. The Via-Cupertino Shuttle, an 18-month OD pilot program offers some insight into how OD could function in Mountain View is one of eight case studies described in detail in Appendix A.

Transportation Network Company (TNC) Partnerships

Another popular option for first/last mile solutions is subsidizing trips on existing TNC services, like Uber Pool or Lyft Line. In most pilot projects, a transit agency partners with a TNC and agrees to subsidize qualified trips (for example, trips with an origin/destination within Mountain View City limits and a destination/origin at a transit center, rail station, or bus stop). Uber Pool and Lyft Line one-way fares from various points in Mountain View to the Mountain View Caltrain Station ranged from $9 to $11. The taxi fare for these same trips ranged from $13 to $14. Mountain View would either need to subsidize the whole amount, with a cap of maybe $15 per trip, or subsidize a share of the trip, with the customer paying the remainder. By comparison, parking at the Mountain View Caltrain Station is $5.50 per day.

Part of the goal of this study is to reduce single-occupancy vehicle trips within the City of Mountain View. Replacing SOV vehicle trips with Uber Pool or Lyft Line trips may keep a few cars off the road and decrease parking demand, but the deadhead travel for the Uber/Lyft driver between trips is still adding to the total Vehicle Miles Traveled (VMT) within Mountain View. Using regular Uber or Lyft service (rather than the shared-ride Pool and Line options) may curb parking demand but is a direct 1:1 tradeoff for SOV trips.

A few other challenges noted by agencies and cities that have piloted TNC partnerships include guaranteeing service availability will meet customer demand, Americans with Disabilities Act (ADA) access compliance, and not being able to secure program utilization data from the TNC. Such data could indicate how well the program is working, who is using the service, and where they are using it.

Ensuring first/last mile connectivity is vital in a community like Mountain View, with multiple regional transit providers, and advances in technology have generated more service options. However, cost and efficiency should be considered in comparing these service alternatives.

Grow Ridership Through Customer Information and Coordination

A key finding from the community survey conducted as part of the Existing Conditions Report was that many residents felt they needed better public information regarding transit service. This was particularly common among younger residents who attended the stakeholder meeting or responded to the survey. In addition to changes to the service and operating model, better public awareness of the Community Shuttle and access to information will increase the community benefit.

The Community Shuttle service was designed to facilitate internal trip-making in the City of Mountain View as well as first/last mile connections to the regional transportation network. The Bay Area transit network is comprised of more than two dozen service operators. This segmented network requires many customers to make multi-operator trips for their daily commute and other travel needs. There is strong demand for a more integrated transit network to attract riders and improve the customer experience on multi-operator trips, from trip planning to fare payment to transfers between operators. Addressing this challenge is critical to increasing transit's regional mode share in the Bay Area and helping Mountain View achieve its GHG reduction targets.[2] For the Community Shuttle to effectively provide first/last mile service as part of a multi-operator trip, a coordinated marketing and customer experience strategy is an important step in making the transit network legible to residents.

Marketing

Ensuring residents, commuters, and visitors are aware of the Mountain View Community Shuttle service is critical to growing ridership and providing an effective service to the community. With so many regional service providers, it is important for Community Shuttle to explain to customers how the service fits in with the rest of the regional network.

TRAVEL TRAINING

Particularly if the service span is extended to better serve school-age children, travel training in Mountain View schools and distribution of a "how to ride" brochure can be an effective tool to grow ridership by this population segment. Parents will likely be more comfortable allowing their kids to travel by public transit if they know their children have been trained and if they, as parents, are more aware of the service. This can be accomplished as a joint programming effort between the City of Mountain View and the Mountain View Whisman School District.

Travel training is also a proven strategy for improving the mobility of senior citizens. The Mountain View Senior Center already offers an abundance of programming and is a stop on the Community Shuttle route. A program designed to help seniors read the bus schedule, locate stops on the street, and use the real-time vehicle locator on their smart phones would improve the perception of the Community Shuttle as an accessible and convenient option. Earlier in this study, the City of Mountain View Senior Advisory Committee (SAC) identified a longer service span as their top priority. Coupling a longer span with some travel training support has the potential to grow senior utilization of the Community Shuttle.

"GETTING AROUND MOUNTAIN VIEW" JOINT MARKETING EFFORT

Even for internal travel in the City of Mountain View, riders have VTA, MVgo, and the Community Shuttle as options. Creating a consolidated service map with all local service and "how to ride" information can minimize the clutter of other connecting regional services and focus on customers who just want to travel within Mountain View (the Community Shuttle as part of a broader regional network will be addressed in the following Integrated Customer Information section). The Transit and Shuttles page of the City of Mountain View website could also showcase sample transit trips to highlight both local trips that can be made on the Community Shuttle as well as the regional destinations that are accessible by transit (ex: Mountain View to SFO).

Integrated Customer Information

A major barrier to more transit ridership in the Bay Area is the patchwork transit network with dozens of operators, each with their own service schedule, transfer policy, fare rate, fare media, and branding. Integrated service and fare media require coordinated efforts and agreements between agencies. The introduction of the Clipper card was an important step toward integration, but there is still room for improved coordination across agencies.

A key to effective transit planning is "thinking like a customer." For a customer to choose transit, the first test it must past is, "Can I get where I need to go on transit?" In some cities/regions there is only one transit operator, so a resident can just check that one website. This is not the case for Mountain View and its surrounding communities. Since memorizing the services of so many providers is not feasible, most transit customers utilize integrated trip planning tools, like Google Transit, to answer this question. Trip planning tools are most effective when they capture all mobility options, including personal vehicles and TNCs, bike routes, all modes of transit open to the public (bus, shuttle, rail, ferry) across all transit agencies, and any other mode of travel.

The second and third tests are, "Is transit cheaper than traveling by car?" and/or "Is transit faster than traveling by car?" Some trip planning apps provide estimated fare along with travel time. However, it is difficult to capture the nuances of every pass option offered by every agency, including zone-based fares, reduced fares, monthly or daily passes, etc. Increasingly, the transit industry is pursuing all-in-one digital platforms, sometimes called "Mobility as a Service" (MaaS). For transit to be truly convenient, trip planning, vehicle tracking/service updates, and fare payment should be centralized in one tool.

Mountain View need not start from scratch to develop an integrated app for residents. Several Bay Area operators provide their schedule information

2 See: Final Report of the 2017-2018 Environmental Sustainability Task Force. City of Mountain View. June 18, 2018. http://laserfiche.mountainview.gov/WebLink/0/edoc/219376/ESTF-2%20Sustainability%20Recommendations%20Report%20-%20June%202018%20-%20FINAL.pdf

and connection to digital fare payment in the Transit app. VTA has a web page encouraging customers to download Transit, calling it "VTA's officially endorsed trip planning app."

According to the Transit app's website (as of January 31, 2020), schedules have been provided by the following regional transit providers. (Note that those in green provide real-time information, while those in regular font provide static schedules.)

- AC Transit
- ACE
- AirTrain SFO
- BART
- Bear Transit
- Caltrain
- Capitol Corridor
- Cloverdale Transit
- County Connection
- Dumbarton Express
- Emery Go-Round
- Golden Gate Transit
- Hyperloop
- Marguerite
- Marin Transit
- Mission Bay TMA
- MVgo
- MUNI
- Petaluma Transit
- PresidiGo
- SamTrans
- San Francisco Bay Ferry
- Santa Rosa CityBus
- SFO Shuttles
- SolTrans
- SMART
- Sonoma County Transit
- Tri Delta Transit
- Vacaville City Coach
- VTA
- Wheels

Caltrain, VTA, and MVgo are all included in the Transit app. By adding the Community Shuttle, the app will have more comprehensive information on all travel options available in Mountain View and the Community Shuttle will be more visible as a service option to potential riders.

Maintain Bus Stops

Another important component of service visibility and ensuring a good rider experience is providing and maintaining the entry point to the service: the bus stop. An ideal bus stop reminds drivers, pedestrians, visitors, etc. that transit is an option (attracting more riders) and, more importantly, gives existing riders clear direction on where to wait for the bus. The ideal stop would also include posted information with the service schedule and, if there are multiple routes, indication on the sign of which route(s) serve that stop. Stops with high ridership, low frequency, or lots of transferring customers are typically the best candidates for bus stop amenities (shelters, benches, trash cans, etc.).

For the Mountain View Community Shuttle, the first step is ensuring bus stop posts and signs are maintained. Some stops on the Community Shuttle are also stops on VTA bus routes. In these instances, the Community Shuttle stop sign was added to the VTA post. Where VTA has discontinued service, the City of Mountain View and/or future Community Shuttle operator needs to ensure these posts and signs and any other amenities at these previously-shared stops are maintained. Ideally benches would be eventually added at all stop locations, however at minimum the heaviest used stops should have benches installed if they currently do not. When stops are added or relocated it is essential that they be ADA accessible which includes adequate clearance for wheelchair boarding and alighting buses and level concrete or asphalt surfaces at the curb.

Pricing Strategies

Community Shuttle Fare

In considering whether or not to collect a fare, every transit operator must consider: 1) How much revenue could be generated, 2) How much it would cost to collect the fare, 3) How much ridership might suffer by introducing a cost to riders. Even with many consumers favoring debit/credit cards or mobile payment (like Apple Pay), public services still need to consider unbanked populations who use cash only. For this reason, most transit agencies still offer an on-board cash payment option, even after introducing mobile ticketing or reloadable passes.

Currently the Community Shuttle is fare free. (The MVgo shuttles are also fare free.) For a community of Mountain View's size, the cost of installing and maintaining a fare collection system will outweigh the potential revenue. Furthermore, some riders will stop riding if a fare is introduced, either because they can no longer afford to ride or they no longer perceive the service to be the most convenient option, knowing they will need cash or some kind of pass to ride. Collecting a fare also has operations impacts, adding dwell time at each stop for customers to pay as they board.

SUBSIDIZE VTA FARES

To provide consistency for internal travel within Mountain View the City may consider entering into an arrangement with VTA to allow boardings within Mountain View to be fare free. This could be applied to all service or limited to select routes. For example if the City decides to modify the Community Shuttle to eliminate duplication with Route 51 allowing free fares on this route in Mountain View would address the concern that Community Shuttle customers would be now forced to pay a fare. It can also encourage more use of VTA services to connect with Caltrain. One concern is if this approach were pursued is how to deal with trips between Mountain View and destinations outside of the city. To keep it simple customers using VTA for trips outside of the city limits would receive a free fare leaving the city but would have to pay when boarding outside of the city in the other direction. A mobility wallet (see below) or an opt-in option for Mountain View residents on Clipper Card may be another approach to provide free or discounted rides on VTA when boarding in Mountain View.

MOBILITY WALLET

Mobility wallets are growing in popularity in the transit industry. Often part of a multi-modal and multi-operator regional system, a mobility wallet provides a digital platform for fare payment to multiple agencies. It can be designed as an e-purse, where the user adds money to their account and the appropriate fare is deducted based on the service provider and mode. Alternatively, some mobility wallets are the smart phone equivalent of a "smart card," identifying the point at which a pass is the more economical option than continuing to pay single-ride fares (fare capping), saving the customer money.

Many trip planning apps, like the Transit app, are working toward building in fare collection capabilities so transit riders can use one app for all their mobility needs. In the meantime, the Clipper card is the most integrated fare payment option in the Bay Area. Metropolitan Transportation Commission (MTC) is in the process of designing the next generation of the Clipper card, called "Clipper 2.0." An app for mobile ticketing is expected and a digital wallet function is under consideration.

Appendix B provides two case studies of mobility wallets and provides detail on how a mobility wallet could be designed and implemented in Mountain View.

CALTRAIN MONTHLY PARKING PERMIT

Caltrain offers customers parking in station lots for a fee. Anyone can purchase a daily parking permit for $5.50 at a ticket vending machine. A monthly parking permit must be purchased in conjunction with a monthly train pass and costs $82.50. Some employers offering commuter benefits pay for monthly Caltrain parking permits for employees. With demand for Caltrain service expected to increase with electrification and other improvements under CalMod, demand for parking will likely exceed the number of available spaces.

The Community Shuttle provides an alternative first/last mile connection to the Caltrain stations in Mountain View. If the Community Shuttle were to charge a fare, Caltrain parking permits could potentially be used in lieu of fare and that portion of Caltrain revenue allocated to the Community Shuttle. Alternatively, partnerships with commuter benefits providers could be developed to allocate funds to the Community Shuttle instead of a parking permit and encouraging employees to use the shuttle to access Caltrain, somewhat like a TMA structure.

Carry Service into the Future Through Financial Sustainability

The immediate issue facing the Community Shuttle is what entity will operate the service beginning in June 2020, when Google will cease operation of the Community Shuttle. However, the other key issue is preparing financially for 2024, when Google will discontinue funding the Shuttle, and beyond. If the City of Mountain View plans to keep the Community Shuttle a fare-free service, it must secure reliable funding sources or partnerships. Decisions about future funding of the Community Shuttle will likely be related to the how the transition of Shuttle operations from Google to another entity is resolved.

MV Measure P (Per-Employee Business Tax)

In November 2018, Mountain View voters approved Measure P, a business license tax that charges businesses based on number of employees (sometimes called a "head tax"). The tax went into effect on January 1, 2020. The majority of the revenue from the business license tax is to be allocated to transportation projects. While there are a number of important and costly infrastructure projects that will utilize these funds, some of the dollars could also be allocated to Community Shuttle service for sustaining existing service and implementing improvements outlined in this report.
.

VTA Measure B Sales Tax Transit Operations Program

Two programs within the Measure B Transit Operations Program include:

- Expand mobility services and affordable fare programs for seniors, persons with disabilities, students and low-income riders.
- Support new/innovative transit service models to address first/last mile connections and provide transit services for the transit dependent, vulnerable populations and paratransit users that is safe and accountable.

Both enhancements to the Community Shuttle or new mobility options to provide access to Caltrain could be funded through this program, however the amount of funds are limited. Funds will be distributed through a highly competitive discretionary grant program and each grant will be for a limited time frame requiring resubmitting applications periodically to sustain successful services.

Bay Area Air Quality Management district Vehicle Trip Reduction Grant Program

A competitive program within the region, grant funding under this program supports several community and rail feeder shuttles throughout the Bay Area. Enhancements to the Community Shuttle service or new mobility options to provide connections to Caltrain would both be eligible for these funds. As with Measure B, the amount of funds are limited, so funds will be distributed through a highly competitive discretionary grant program and each grant will be for a limited time frame requiring resubmitting applications periodically to sustain successful services.

Next Steps

A number of options have been provided in this report to provide the City Council with information needed to make informed decisions regarding the provision and promotion of public transportation in the city. Because of ongoing discussion, the long-term governance of the Community Shuttle is not addressed in this report. Making that determination will set the foundation for the future of the Community Shuttle. Another issue that will need to be addressed if a new contractor provides service is identifying charging infrastructure and determining the type and ownership of vehicles used for shuttle service.

APPENDIX A

What is On-Demand Transit?

On-Demand Transit also known as micro transit is a shared ride service that allows customers to request a trip rather than catching a bus at designated stops at designated times. Variations of On-Demand transit have existed for over 50 years and have historically been referred to as dial-a-ride. The passage of the Americans with Disabilities Act (ADA) in 1990 mandated the provision of dial-a-ride service (referred to as ADA complimentary paratransit service) within ¾ mile of local bus routes and fixed guideway (light rail, heavy rail (e.g. BART) or commuter rail) stations during all hours that the bus or rail service is provided for individuals whose disabilities preclude them from using those services.

Traditional dial-a-ride and ADA paratransit (the distinction is that the former is open to the general public while that latter is restricted to individuals with disabilities and occasionally all individuals over a specified age) have involved a customer phoning a call center to manually schedule their trip. Most ADA paratransit services have required at least 24-hour advance notification. Where same-day reservations can be made, waits of an hour or more between placing the reservation and pick-up were not uncommon. Most of these services are curb to curb in that they will transport the customer between the address of the starting point of the trip to the address of the destination. Productivity of most dial-a-ride and paratransit services is typically under 3 boardings per hour of service and often under 2 boardings per hour.

In the late 1960s, dial-a-ride was seen by many as the future of public transit in lower density suburbs with polycentric travel patterns. The Santa Clara County Transit District (the predecessor to VTA) initiated a countywide dial-a-ride service in late 1974 which ran for only 5 ½ months. One of the reasons for its failure was not having enough vehicles to meet demand – it was estimated to need four times as many vehicles; however, because of the nature of On-Demand services, it was still less productive than the fixed route network that succeeded it.

With the exception of ADA paratransit, which is mandated by federal law, dial-a-ride never became as widespread as originally anticipated except in smaller rural communities.

Over the past decade, the advent of Transportation Network Companies (TNCs) such as Uber and Lyft have introduced new opportunities for transit agencies to revisit traditional dial-a-ride programs. TNCs work through customer-friendly smartphone applications that use complex algorithms that match riders to drivers and develop efficient routings for getting riders where they need to go. These programs have soared in popularity over traditional taxi programs because the platforms are easy to use, allow for spontaneous trip planning, eliminate cash payments, and provide information on the driver and estimated trip times. Transit agencies are leveraging this technology to provide new On-Demand or micro transit services to supplement traditional fixed-route options. These new On-Demand programs leverage the dynamic routing and corner to corner pick-ups of TNC technology creating a new experience for riders. They also cut down on labor costs of taking reservations and scheduling trips, though call centers still exist for those who do not have access to a smart phone or prefer making reservations over the phone. Many agencies across the country have started testing micro transit pilot projects, with mixed results. This appendix reviews the outcomes of eight different pilot projects and offers lessons learns and potential applications for the City of Mountain View.

Types of On-Demand Transit

There are three primary business models for providing On-Demand transit services.

1). The entity providing service contracts with an app provider for the software to be used for customer reservations and scheduling vehicles, while the agency is responsible for actual service operations.

2). The entity providing service enters into a turnkey arrangement for both the reservations and scheduling app and the actual service provision. This is the model used by the City of Cupertino for their On-Demand service

3). The entity providing service contracts with one or more TNC and/or taxi company to provide service usually by providing the customer with a subsidized ride.

There are multiple applications of On-Demand transit.

- Replace existing low productivity fixed route or route deviation services (route deviation service is a conventional bus route that is allowed to deviate off its route to serve destinations within a defined distance from the bus route. Customers traveling to and from bus stops along the route need not make arrangements and will use the timetable to determine when the bus will arrive, while customers needing the bus to deviate need to call for a reservation or inform the driver upon boarding).
- Provide public mobility access to low-density areas that are not served by fixed route service.
- Supplement existing fixed route service, partially to accommodate trips that are not well served by the existing fixed route service.
- Substitute for fixed route service during times when demand for transit service is low.
- Provide first and last mile service to fixed route service.

Case Studies

SamTrans

SamTrans provides transit service throughout San Mateo County. They initiated On-Demand service in Pacifica in May 2019 to replace a route deviation service. The goals for the service were to provide more rides but at a lower cost. The demonstration failed on both accounts and is being discontinued. Samtrans contracted with Via for the reservation and scheduling app and used an existing contract with MV Transportation to provide the service using branded mini vans. One vehicle operates in a 5 square mile area providing internal trips. Most trips travel to and from a retail center or the transit hub across from the retail center for connections to fixed route service operating along Highway 1. The service uses virtual stops requiring customers to walk to the nearest intersection (corner to corner).

The service was provided from 6:15 AM to 6:45 PM on weekdays only. Customers could make reservations using the Via app or by calling the Samtrans call center. The call center hours did not match the hours of operation as it did not accept calls until 7 AM. Customers could pay using the Via app or on board the vehicle. The fare for this service was the same as SamTrans fixed route service including discounts and a reader on board the vehicles allowed for the use of Clipper Card.

The route deviation service generated nine boardings per hour while the On-Demand service generated seven boardings per hour. Average daily ridership dropped from 90 per day to 78 per day. Complaints per month increased from less than one per month to four per month. The cost of the On-Demand service was $151 per hour compared with $131 per hour for the previous service. The cost per rider was $24.20.

AC Transit

AC Transit provides fixed route bus service to communities on the east side of San Francisco Bay between Richmond and Fremont. AC Transit instituted two On-Demand pilots in 2017 branded as AC Flex. One in Newark replaced an existing route while the other in Castro Valley supplemented existing fixed routes that continued operating and added service to an area not served by fixed route service. Customers could use an app or call the AC Transit call center to arrange a trip between any two designated stops within the service zone. All stops were designated by sign with a flex label. The Newark service had scheduled departure times for the Union City BART allowing customers to walk up without a reservation. The Castro Valley service served the Castro Valley BART Station at designated times also allowing walk-up customers.

The service was provided between 6 AM to 8 PM weekdays only. Regular AC Transit fares were applied and could be paid on board. AC Transit used cut away buses operated by AC Transit drivers. The initial cost per hour for the Flex service was $220. AC Transit set a goal of five to seven boardings per hour; however neither service achieved that goal with the Newark service generating 2.42 boardings per hour and Castro Valley generating 3.07 boardings per hour.

AC Transit planned on eliminating the Newark On-Demand service in conjunction with restructuring of service in the area based on both on low productivity and a customer survey indicating a preference for fixed route service. However with the advent of COVID-19, AC Transit discontinued both services in March with no plans to restore them.

Tri Delta Transit

Tri Delta Transit provides fixed route and ADA paratransit service to the cities of Pittsburg, Antioch, Oakley and Brentwood in Eastern Contra Costa County. They introduced two On-Demand pilots; one in Antioch the other in Pittsburg. Both pilots were introduced in low density residential areas that did not have fixed route bus service. Tri Delta did not establish goals for the service when implemented – rather the objective was to determine if micro transit could be a viable option for providing service to areas that could not easily or efficiently served by fixed route service. Tri Delta contracts with TransLoc for the reservation and scheduling software and with First Transit to provide the service. First Transit operates all fixed route and paratransit service and this service is part of that contract.

Service is provided between 5 AM and 9 PM weekdays only and while trips can be made internally

within the zones most trips are to and from the Antioch BART station for the Antioch zone and the Pittsburg BART Station for the Pittsburg zone. The service is corner to corner. Customers must download the TransLoc app on their smart phone and set up an account for fare payment. The fare is $2, the same as local fixed route service. Tri Delta does not issue transfers. The Antioch zone is about five square miles and the Pittsburg zone is three square miles. The average wait time is 13 minutes and the average trip time is also 13 minutes.

Tri Delta allocates 80% of all costs to fixed route service and 20% of all costs to paratransit including the two On-Demand pilots. Therefore using this costing method, the On-Demand service operating cost is $59 per hour. The cost per rider is $11.91. Specially branded paratransit buses are used for this service. Currently productivity during peak hours is about 11 boardings per hour but only 1 boarding per hour during the midday, driven by the fact that most riders are commuters traveling to and from BART stations during peak periods.

Tri Delta was not satisfied with TransLoc app and will be switching over the VIA app on June 15, 2020. The TransLoc app would not give an ETA until payment was made, and frequently adjusted the ETA after that time and sometimes the trip would drop off completely. The VIA app will also have a call-in option for making reservations.

Via Cupertino Shuttle

The City of Cupertino contracted with Via to provide an On-Demand transit service within the city limits. Unlike the examples above, this is a turnkey contract in which Via provides both the app and operates the service on behalf of the city. The service supplements VTA fixed route service within the city providing trips between anywhere within the city limits (an area of 10.5 square miles) and to and from the Sunnyvale Caltrain Station. The service is corner to corner. During the first three months an introductory fare of $1 was charged. Since the beginning of February, the fare has been $3.50 per trip. Customers use the app to request a trip and pay with their credit or debit card. Via maintains a call center which accommodates customers who wish to reserve on the phone but they must set up an account with their credit card to pay if they use this method.

The goal was to average 3.5 boardings per hour of service; a goal that was achieved in March just before COVID-19 impacted demand when weekday ridership grew to average 160 per day. There was a slight drop in ridership during the first week of February after the $3.50 fare was implemented; however, the growth trajectory of ridership resumed after that. Performance reaches four to five boardings per hour during three times of day: the AM Peak, consisting of students and commuters; around noon where demand is primarily from senior residents, and the PM Peak when commuters are returning home. Sunnyvale Caltrain is the busiest stop.

The operating cost has been $65 per hour. The cost per passenger is $18.57. However Via operators are contract drivers similar to Uber and Lyft and are subject to AB5 classifying them as employees. It is anticipated that the cost per hour will increase as a result unless a ballot measure to overturn AB5 passes in the November 2020 election.

Service was initially provided weekdays 6 AM and 8 PM and Saturdays between 9 AM and 5 PM. Saturday service is temporarily discontinued due to COVID-19. The average wait time once a reservation is made is 15 minutes with average trip time of 10 to 12 minutes. As demand grew in late February and early March wait times grew to 20 to 30 minutes with an occasional 40 minute wait until Via leased additional vans to meet the demand. Via leases the vans from Avis using seven passenger vans (driver and six passengers). One van is accessible to comply with ADA requirements.

The service is generally popular with residents and users. The only negative comment is a desire to serve more destinations outside the City of Cupertino, particularly the Mountain View Caltrain Station. The city is considering extending service to both the Mountain View Caltrain and El Camino Hospital within the City of Mountain View.

The city plans on extending service beyond the pilot. It is currently funded by the City general fund. The city is looking to use another source of funding such as Cupertino's share of Measure B which can be used for other transportation purposes if pavement condition exceeds a state of good repair threshold. Long term the city would like for Apple to fund the service, possibly replacing their own vans currently used for the inter-campus shuttle.

LAVTA

The Livermore Amador Valley Transit Authority (LAVTA) provides public transit service in the cities of Dublin, Livermore, Pleasanton and unincorporated portions of eastern Alameda County. Fixed routes were restructured in 2017 with the goal of placing more emphasis on performance instead of service area coverage. Poor performing routes were eliminated and frequency was increased on main lines and BRT routes. This left a significant portion of the City of Dublin without fixed route service. The City of Dublin also has parking issues at the crowded Dublin BART station. Therefore, LAVTA entered into a partnership with Uber, Lyft and De Soto Cab to provide transportation within the City of Dublin in a program called Go Dublin.

The program paid for half of the TNC fare, up to $5.00, for trips made on Uber Pool, Lyft Line or De Soto Cab. Trips must begin and end within the City of Dublin. Passengers were required to use the ride share version of the TNC services so as to be consistent with public policy to promote carpooling. LAVTA received a $100,000 grant for the pilot program. Go Dublin carries roughly 1,000 to 1,500 rides per month at an average subsidy of $2.80 per trip. The majority of trips begin or end at the BART station. In comparison to the previously operated fixed routes in Dublin, the ridership is similar but the operating subsidy for the discontinued services was greater, on the order of $15 – 20 per trip. LAVTA included De Soto Cab in the program as they have wheelchair accessible vehicles. Interestingly, De Soto has yet to receive a request for an accessible vehicle. Part of this could be due to the fact that paratransit service continues to cover the area.

Go Dublin uses existing apps from the TNCs, thereby eliminating startup costs. Requesting a ride is also quite simple. Passengers need only to sign up for Uber Pool or Lyft Line and enter the promotion code. The app remembers the promotion code for the next ride. As for marketing, LAVTA relied mostly on Uber and Lyft to promote the program with the exception of one postcard mailing.

As private companies, Uber and Lyft are competitive and reluctant to provide all data collected. For this reason, LAVTA only receives each month: 1) the number of trips provided, 2) subsidy per trip and a 3) heat map showing pick up/drop off locations. They are unable to collect any information about the riders themselves – demographics, frequency of use – factors that would allow LAVTA a better understanding of who uses the program.

West Sacramento

The City of West Sacramento initiated a micro transit pilot in 2018 and is currently seeking to extend its contract with Via to continue this service through at least June 2022. The contract with Via is a turnkey arrangement similar to Cupertino's. West Sacramento is located in Yolo County and the county transit provider Yolobus provides fixed route service within the city as well as regional service to the City of Sacramento and other communities in Yolo County. Yolobus service is supported by West Sacramento's TDA allocation. The City initiated the micro transit project because it felt that the fixed route service did a poor job accommodating internal trips and because one route in particular (Route 35) was very unproductive, generating nine boardings per hour on weekdays and less than two boardings per hour on weekends. Since inception, the On-Demand service operated in addition to the Yolobus fixed route service. While there have been no pre-COVID-19 reductions in Yolobus service, the plan is to discontinue Route 35 and reallocate its resources to improve frequency on regional routes serving West Sacramento, with micro transit and ADA paratransit continuing to serve the neighborhoods currently served by Route 35.

Ridership during the first year exceeded expectations and has resulted in an increase in service hours during the second year. Service is provided between weekdays from 6 AM to 11 PM, Saturdays from 9 AM to 11 PM, and Sundays from 8 AM to 8 PM. Service is provided corner to corner although curb to curb pick-ups will be provided for registered individuals with disabilities this service is not a replacement for ADA paratransit service which is also provided city wide and will continue serving areas that will no longer be within ¾ mile of fixed route service). The average wait time is 12 minutes and the average trip time is 12 to 15 minutes. The fare is $3.50 with free transfers to and from Yolobus. The Yolobus fare is $2.25.

Despite growth in ridership, there was a need to add vehicles to accommodate this growth resulting in only a small increase in productivity from 3.24

boardings per hour in FY 2019 to 3.63 boardings per hour in FY 2020. The average weekday ridership pre-COVID-19 was 461 and the average weekend ridership was 250. The cost of providing service is $59 per hour or $11.12 per rider.

LTD Cottage Grove OR

Lane Transit District (LTD) provides transit service in Eugene, OR and surrounding areas. Cottage Grove is a small community about 18 miles south of Eugene. LTD provides eight trips on weekdays from Eugene that provide a loop through Cottage Grove. An On-Demand service was established to provide in town trips that were not well served by the one way loop provide by the LTD fixed route. Using the TransLoc app, a nonprofit social service agency was contracted to provide the service from 7 AM to 7 PM on weekdays. The fixed route was initially cut back to a park and ride, however since the app did not coordinate trips between the On-Demand service and the fixed route, resulting in a loss of ridership on fixed route; the fixed route loop was restored . The On-Demand service has an average wait time of 21 minutes and generates up 90 trips per day or 7.5 boardings per hour. The cost of providing service is $48 per hour.

Service has been suspended as a result of COVID-19.

VIA San Antonio TX

VIA is the transit provider for the San Antonio, TX region (there is no relation with Via, a private company based in New York City that provides On-Demand service in Cupertino and throughout the United States and other countries). VIA initiated an On-Demand service in a low-density residential area replacing three low productivity fixed route bus routes. VIA contracts with RideCo on a turnkey basis. RideCo contracts with Yellow Taxi to actually provide the service which is provided with branded mini vans. The contract is a fixed cost contract and not based on service hours.

As with most On-Demand service described here, the service utilizes virtual stops that customers walk to. Customers may book a ride between any two locations in the zone. Customers choosing not to use the app to book a trip can call a special number at the Yellow Taxi dispatch office. The average wait time to be picked up is 10 minutes with the average trip time of 10 to 15 minutes.

The three fixed routes carried an average 700 boardings per weekday while the replacement On-Demand service carries an average 650 boardings per weekday. On-Demand productivity averages 5 boardings per hour. Service is provided between 5:30 AM to 9:30 PM seven days per week to match the longest service span of the prior fixed routes, resulting in a longer span of service for most customers. The zone is 19 square miles. Regular VIA fares are charged with free transfers to fixed route service at transit hubs for travel beyond the zone.

Summation of Findings

Lesson learned from the case studies described above include:

- The cost per hour ranges from a low of $48 per hour (when contracting with a nonprofit organization) to $220 per hour (when using agency employees).
- The cost per passenger ranges from $11 to $24 for non-TNC subsidized fare services. The highest fare charged is $3.50, therefore still results in a significant subsidy.
- Boardings per hour range from 3.5 to 11. The higher performance occurs during peaks when all trips originate or terminal at a rail station. The better performing projects tend to have productivity between 5 to 7 boardings per hour. The service that had the highest peak productivity (11) also had the lowest off peak productivity (1).
- Where services replaced fixed route buses ridership was lower on the On-Demand service (although not always significantly lower) even though the On-Demand service may have had longer service span, served additional areas, or replaced low frequency service with service that could be summoned at any time.
- Using existing TNCs involves subsidizing the fare charged by the TNC. Since TNCs have priced service below the cost of providing service to grow market share; it is likely that TNCs will need to significantly increase the prices charged to customers. If AB5 is not overturned in November the cost of TNC fares or services provided by mobility companies such as Via will also need to increase.

Agency	Business Model	Base Fare	Cost Per Rider	Cost Per Hour	Boardings Per Hour
SamTrans	1	$2.25	$24.20	$151	7
AC Transit	1	$2.50		$220	2.42 to 3.07
Tri Delta	1	$2.00	$11.91	$59	6
City of Cupertino	2	$3.50	$18.57	$65	3.5
LAVTA	3	*	$2.80	*	*
City of West Sacramento	2	$3.50	$11.12	$59	3.63
LTD	2	$1.75	$6.40	$48	7.5
VIA San Antonio	1	**	**	**	5

BUSINESS MODELS

1. The entity providing service contracts with an app provider for the software to be used for customer reservations and scheduling vehicles, while the agency is responsible for actual service operations.
2. The entity providing service enters into a turnkey arrangement for both the reservations and scheduling app and the actual service provision. This is the model used by the City of Cupertino for their On-Demand service.
3. The entity providing service contracts with one or more TNC and/or taxi companies to provide service usually by providing the customer with a subsidized ride.

* LAVTA subsidizes ½ the TNC fare up to $5. The average has been $2.80 per trip.
** VIA has a fixed-price contract that does not vary based on hours provided.

Implications for Mountain View

Prior to COVID-19 impacts on transit ridership, all fixed route transit services in Mountain View (VTA, Community Shuttle and MVgo) generated higher productivity as measured by boardings per revenue or service hour than any of the On-Demand services described above. A larger survey of micro transit services has not found any with higher productivity and many with lower productivity than the case studies included in this report. Based on these findings, it is most likely that a micro transit pilot in the City of Mountain View would carry fewer riders and cost more than the existing fixed route services in place today, however may have applicability for serving new markets.

The Community Shuttle and MVgo service currently charge no fares whereas a micro transit service would need to charge a fare. Micro transit services are limited in the number of passengers they can carry per hour due to the nature of dynamic routing. Unlike fixed route transit which operates on specified alignment, On-Demand transit deviates to pick up customers (even with virtual stops requiring the customer to walk to be picked up). If this type of service is offered for free, assuming basic principles of supply and demand, it will be oversubscribed, requiring more vehicles and operating costs considerably higher than fixed route service.

Micro transit could possibly serve some areas or trip needs not adequately served by existing transit services. An examination of unmet transit needs and whether On-Demand transit service could fill the need include:

- **Earlier or later hours for the Community Shuttle**. The Community shuttle only operates between 10 AM and 6 PM and one of the top requests received both in the community survey and stakeholder meetings was to expand the hours of operation. Given the high productivity of the Shuttle (27 boardings per hour) even if productivity were cut in half during extended hours; productivity of 14 boardings per hour is still higher than what could be achieved with micro transit.
- **Areas poorly served by existing services**. In December 2019, VTA eliminated service on Montecito Ave. and on Middlefield Road west of Moffett Blvd. The Community Shuttle serves Middlefield Road between Moffett Blvd. and Rengstorff Ave but does not provide direct service to Downtown Mountain View (customers from these areas can ride the Community Shuttle to Downtown, however it is a circuitous route either via El Camino Hospital or San Antonio Center). Creating a zone north of Caltrain could complement existing services and fill travel needs not well served by existing VTA or Community Shuttle services.
- **Access to Caltrain**. Parking is severely limited at both Caltrain Stations in Mountain View. While Caltrain ridership may be depressed over the next one to two years due to impacts of COVID-19; long term ridership is likely to pick up particularly after electrification is complete and Caltrain operates service every 10 minutes. Since adding parking capacity is not likely or desired, creating a micro transit service focused on Caltrain could provide access for individual's not well served by existing transit services and eliminate the constraints on Caltrain ridership due to limited parking. Micro transit pilots that provide first/last mile access to rail stations are some of the most productive. Service could be provided from specific zones or could link the entire city, supplementing VTA and Community Shuttle service.

If Mountain View chooses to implement a micro transit pilot, it will need to identify the source of funding. The funding sources identified in the Existing Conditions Report (Mountain View Measure P, VTA Measure B and the Bay Area Air Quality Management District Vehicle Trip Reduction Grant Program) could be used to institute an On-Demand transit pilot. For Caltrain focused micro mobility services the use of value capture from Transit Oriented Development (TOD) around the two Caltrain stations or a partnership with Caltrain to utilize parking revenues to fund the service as parking alternative are potential sources of revenue.

Unlike Cupertino and West Sacramento, where existing fixed route service does not fully or effectively meet internal travel needs, the Mountain View Community Shuttle is productive. While there are unmet needs as identified above, investment in a micro transit pilot and sustaining it if successful needs to be balanced against the need to sustain and expand the Community Shuttle.

APPENDIX B

What is a Mobility Wallet?

There is no commonly accepted definition of a mobility wallet, but it generally refers to a collection of mobility-related services packaged together into a single service or pass. For example, a mobility wallet could include a monthly pass for transit, a credit for bikeshare, and reduced prices for a carshare service. Fundamentally, the purpose of a mobility wallet is to provide a variety of mobility options for users to meet a variety of mobility needs, reducing or eliminating users' reliance on automobiles.

Mobility wallets can also help solve a key barrier to mobility: access to information. When evaluating how to complete a trip, individuals must first know all options available to them, and then they have to cross-reference pricing and schedules from multiple different websites in order to decide which mode best suits their needs. A mobility wallet can help solve this problem by consolidating all of the information in a single platform.

Mobility wallets are a relatively new concept in transportation and mobility and can be implemented in a variety of ways. At the most basic, a mobility wallet can simply be a collection of passes bundled together at a subsidized price. At the most complicated, a mobility wallet is a single app or service that integrates a number of mobility services with unified payment and trip planning. Mobility wallets can be administered by cities, transportation agencies, or private companies.

Mobility as a Service

Many implementations of mobility wallets, especially those offered by private companies, are branded as a form of "Mobility as a Service" or MaaS. While mobility wallets and MaaS are closely related, they are not the same thing. Mobility as a Service, a response to changing mobility norms, is the idea that mobility can be provided as a service, such as through a subscription app, rather than as a product, such as car ownership. Mobility as a Service is generally provided through apps, which usually focus on integrating different trip modes into a single integrated service. Mobility wallets can be part of implementing MaaS but are not the only way.

Case Studies

Two case studies will be presented in this report: Portland, Oregon's transportation wallet, and the Whim app, in Helsinki, Finland. These case studies were chosen to show a variety of approaches and implementation strategies.

Portland Transportation Wallet

The City of Portland, Oregon implemented a transportation wallet in 2017, and it is the most relevant example for Mountain View. The program is currently limited to individuals that live or work in two neighborhoods in the city, although the City is currently running a pilot program that would expand the service to affordable housing communities throughout the city. The wallet is very simple; it includes passes and credits for a number of mobility services at a greatly discounted rate. The contents of the wallet change slightly each year, depending on funding and partnerships available. For 2020, the wallet, for an annual cost of $99, provides:

- A $100 or $250 TriMet credit, depending on neighborhood. TriMet is Portland's regional transportation agency and operates the bus and light rail service;
- An annual pass for the Portland Streetcar, a $440 value;
- A $99 BIKETOWN, Portland's bikeshare service, credit; and
- A $10 credit to each of three scootershare providers.

Currently, the wallet does not unify the services in any way, and as such, does not attempt to solve the information problem. Users for the service are mailed a Hop Card, Portland's Clipper equivalent, which contains the TriMet credit and Streetcar pass as well as codes that can be used to add bikeshare and scootershare credits to their relevant personal accounts. In the future, Portland is planning on providing an app that would better combine the services, and improve the information available to users.

Portland's transportation wallet is administered by the City's Department of Transportation and funded through fees levied on parking permits; the two areas that have access to the transportation wallet are actually areas with preexisting city-run parking permitting zones. The transportation wallet is intended to provide an alternative to driving and parking in those neighborhoods, and to ensure that those who do drive in these communities have access to parking. Residents and employees in these neighborhoods who have already purchased parking permits are allowed to trade in the permit for a transportation wallet.

The wallet has been extremely successful; in both parking districts, the number of parking permits issued has decreased, and many residents and employees have traded in parking permits for wallets. Even more encouragingly, those who use the transportation wallet have changed behaviors. More than a third of users reported they used TriMet, the Streetcar, and BIKETOWN more frequently after purchasing a transportation wallet while 32 percent of users indicated they now drive less.

Whim

Whim is a Mobility as a Service app, launched in Helsinki, Finland in 2017. Operated by a private company, MaaS Global, Whim is perhaps the most widely-known implementation of Mobility as a Service. The service is primarily monthly subscription based with three tiers. The first tier is transit-focused, including a 30-day transit pass, unlimited 30-minute bikeshare rides, a limited number of reduced taxi fares, and reduced-price car rentals. Prices for the lowest tier start at just under 60 euros, approximately $65; Helsinki has a zone-based fare system, and the subscription price varies depending on the zones included in the transit pass. The higher tiers offer the same transit and bikeshare benefits, but more generous taxi and rental car discounts. In addition, the app offers a pay-as-you-go option, where the user is charged regular prices for all services.

Whim also integrates all of these services, as well as scootershare, into a single app. Users can open the app, see what transportation options are available to meet their needs, and pay for the relevant ticket or pass, all in the app. The core idea behind the service is that users will be able to buy a subscription that covers day-to-day mobility needs in single, monthly fee by relying on a backbone of transit and active transportation. When transit and active transportation cannot meet a user's need, they have the option to rent a car or use a taxi at a reduced fee. Ideally, this gives users a reason to forgo car ownership, reducing the prevalence of single occupancy vehicles and increasing transit use.

MaaS Global, a private company, has not published statistics about how its services change user behavior, so it is difficult to understand how effective Whim is at encouraging transit use or reducing car use. Whim, however, is clearly successful; the service is now available in three other European cities and plans to expand to Tokyo and Singapore in the future. MaaS Global does not provide any mobility services itself, so Whim relies on partnering with cities, transit agencies, and private mobility operators, such as taxi and scootershare companies, in the regions it operates.[1]

Other MaaS Providers

Mobility as a Service, as an industry, is growing rapidly. Whim is just one of many MaaS startups, and many tech and mobility companies are increasingly aiming to access the industry. Intel recently purchased Israel-based MaaS provider Moovit for $900 million, planning to pair Moovit's services with autonomous taxis that are currently under development by another Intel subsidiary, Mobileye.[2] Both Uber and Lyft are moving towards becoming complete MaaS operators, integrating public transit and bikeshare into their apps.

Uber, Lyft, and Intel all offer, or are planning to offer, mobility services in addition to providing a MaaS platform. Such companies have an incentive to direct users towards the mobility options that they provide, and away from services like public transit. In addition, these companies are building MaaS platforms that do not necessarily require close partnership with city governments and transit agencies, and the platforms are likely going to be available to users in Mountain View whether or not the City works with the platform provider.

1 portlandoregon.gov/transportation/article/757304
2 venturebeat.com/2020/05/06/before-intels-900-million-bid-moovit-wanted-to-raise-more-money-then-the-pandemic-hit/

Mountain View

Mountain View is a strong candidate for a mobility wallet. The city has a number of mobility options operated by a variety of transportation providers, and providing a mobility wallet to residents or employees could significantly change how users choose to travel in and to Mountain View. Potential service options include:

- **VTA:** A mobility wallet could include a pass or reduced fare on VTA light rail and buses. Current mobility wallets and MaaS providers place an emphasis on public transit being the core of the service, so strong transit benefits are probably a necessity for a successful mobility wallet program.
- **Caltrain:** A mobility wallet could include a Caltrain pass, or reduced fare. The pass or reduced fare could apply to pre-identified Caltrain zones, or users could have the option of purchasing a wallet that applies to different zones for a variable price.
- **Bikeshare:** Core to the idea of a mobility wallet is having multiple options available to users. Bikeshare is likely to be an important part of a mobility wallet. Mountain View is currently running a bikeshare pilot program and has a significant amount of control over how and if bikeshare providers operate in the city. Mountain View could require bikeshare operators to participate in a mobility wallet program to operate in the city.
- **Scootershare:** Mountain View is currently planning a scootershare pilot program. Similar to bikeshare, Mountain View could require scootershare operators to participate in a mobility wallet program.
- **MVgo and the Mountain View Community Shuttle:** While these services are currently free to use, a mobility wallet that integrates information of all transportation could further increase the visibility and convenience of these services.

Administration

Mountain View has two potential administration options for a proposed transportation wallet. The simplest is to administer the program through a City department, such as Public Works. This is the model that Portland uses. It allows for the City to have a great deal of control over the program, but Portland officials have noted that the administrative burden from the program is high, largely stemming from the need to manually put together and mail each wallet to users. Portland is working to reduce this administrative burden by producing an app, something that Mountain View may also need to consider. Mountain View could also work with a separate, existing entity to administer the program, such as the Mountain View Transportation Management Association (TMA), in a similar manner.

The second option is to provide a mobility wallet through a public-private partnership, such as Whim. MaaS Global is not the only provider of such services, and the transportation technology is a growing space. Partnering with a private company would reduce the administrative burden on Mountain View while providing some level of control over the program. However, as these companies are for-profit, they will only partner with Mountain View if they feel there is a viable business case to do so.

Beyond who will administer the program, Mountain View will need to decide where to administer the program; the City needs to consider if the program will be available to parts of the city or the whole city, and whether it covers both those that work in the city and those that live in the city, or just one or the other. Mountain View has an existing parking permitting program that it could leverage, in a manner similar to Portland.

Funding Sources

Potential funding sources for a mobility wallet depends on how Mountain View chooses to administer the program. If Mountain View chooses to work through a public-private partnership, there is potentially no need for a dedicated funding source; MaaS providers, such as MaaS Global, generate their own revenue through the convenience they provide and the value proposition they offer. Offering a subsidy is not a necessity for a city-administered program either, but the wallet would need to provide some other utility to users, such as improved information or convenience.

If Mountain View does choose to offer their own subsidized mobility wallet, or wants to subsidize a public-private partnership to make the program more appealing, Mountain View will need to identify funding sources. Potential funding sources include:

- **Parking Permit Fees:** Like Portland, Mountain View could raise fees on the existing parking permitting program to generate revenue to provide subsidized mobility wallets to residents and employees in the parking district.
- **Expansion of Transportation Management Association:** The City could work with major employers and existing members of the TMA to guarantee funding contributions to a mobility wallet program, possibly in exchange for a reduction of regulations in another form, such as less strict parking requirements.
- **Mobility Provider Fee:** Funding could be generated by placing fees on mobility modes the City wants to discourage. For example, the City could place a small fee on Uber and Lyft rides, both generating income and making a mobility wallet a more attractive alternative.
- **General Fund:** Mountain View could fund a mobility wallet through the general fund, especially for a pilot program.

Clipper Card Integration

Clipper Card is currently being updated to meet modern mobility needs, with full rollout of the improved service expected in 2023. Notably, the update will include an app that allows users to manage their account and plan integrated trips across all participating transit systems. The updated Clipper Card will also permit wider Clipper Card usage, potentially including paying for parking at stations or paying for other mobility modes. These additional options are reliant on service providers and Clipper working together to implement Clipper payments, and as a result, may not be available for every (or potentially any) scootershare services, for example. It is also not clear how the improved Clipper Card will accommodate discounts or passes for all services. For example, while a user may be able to pay for bikeshare using a Clipper Card, it may not be able to accommodate a 50 percent discount on that bikeshare.

The updated Clipper Card will offer a valuable resource for a Mountain View administered mobility wallet; the app would reduce the administrative burden on the City, and the app could provide many of the conveniences that a public-private partnership would.

Recommendations

First, Mountain View needs to establish goals for the mobility wallet program. Is the chief goal to reduce demand for parking in the city's core? Or to reduce the number of workers driving into Mountain View? Many goals are compatible, and a mobility wallet program could meet many goals. However, the services the wallet include will change based what goals are prioritized.

Mountain View should administer its own mobility wallet or work with the Mountain View TMA to administer the program. By administering its own mobility wallet, Mountain View will have more flexibility in how the program is structured and will be able to make changes to the program as necessary. In addition, Mountain View's existing mobility options, MVgo and the Community Shuttle, can be more tightly integrated into the program, and users can be directed to these services as a free backbone for transportation within the city. Clipper Card integration will reduce the administrative burden and should provide many of the same benefits to users as using a MaaS provider.

The City will need to work with VTA, Caltrain, and other mobility service providers to understand exactly what services could be included in a mobility wallet, and for what price. That information, combined with the goals of the program, will determine what an initial mobility wallet will look like. That wallet can then be tested through a pilot program, potentially using Portland's model of limiting the wallet to a parking permit district.