SHASTA Regional Transportation Agency

Sunday Transit Demonstration Project

Sketch Planning of Service Options

Working Paper # 2

Submitted to:

Shasta Regional Transportation Agency

1255 East Street, Suite 202
Redding, CA 96001

Revised May 22, 2018

Submitted by:

mobility PLANNERS

601 Midrock Corners
Mountain View, CA 94043
www.mobilityplanners.com

In Association With:

AMMA TRANSIT PLANNING

TRANSIT marketing LLC

DEMANDTRANS

Table of Contents

1. Introduction

Study Purpose

The primary purpose of the Shasta Regional Transportation Agency (SRTA) sponsored study is to "develop an implementation plan for SRTA for an 'on-demand' transit service demonstration project that will run on Sundays."

In the kick-off meeting with SRTA and in subsequent phone calls, there was an emphasis on shared ride on-demand services. There is a desire by SRTA to reduce vehicle miles travelled in the Shasta Region and an important project selection criterion for Sunday service will be the degree of shared ride services provided.

There has been a significant amount of input on Sunday service from both the 2014 Short Range Transit Plan and the ongoing annual Unmet Transit Needs process that the Shasta Regional Transportation Agency (SRTA) conducts on an annual basis.

Overview of Working Paper #1 Market Research

Working paper #1 for the Sunday Service "On Demand" Feasibility Analysis provides the results of the market research effort. This includes:

- Background information on existing public transportation services in Shasta County
- Findings of the 2012 Short Range Transit Plan regarding Sunday service
- SRTA Unmet Needs Process: Requests of Sunday Service
- Review of 2015/16 RABA Fixed Route Service Demand Comparing Weekday and Saturday service
- Results of RABA Onboard Survey on Sunday Service
- Results of supplement Online Survey and Survey of Dignity Health Connected Living Adult Day Care Passengers
- Review of Potential Sunday Service Providers
- Preliminary Screening of eight potential service delivery options

In reviewing Working Paper #1 with SRTA staff, it was decided to carry forward one fixed route baseline option and three on-demand service delivery options. It was also decided that fares would be kept constant for all service delivery options at $1.50 base fare and $0.75 for seniors/disabled individuals.

The evaluation criteria for the Working Paper #2 Sketch Planning was expanded to now include the following:

1. Farebox recovery: 20% for urban only service, 10% for rural only services and 18% for blended rural and urban area services.
2. Total Sunday Service subsidy costs. This is the total cost minus the projected farebox revenues.
3. Shared ride potential. This is measured in passengers per vehicle revenue hour.
4. Average daily ridership
5. Vehicle miles travelled
6. Impact on ADA accessibility
7. Relative total travel time for sample origin and destinations
8. Coverage impacts compared to RABA Saturday service
9. Responsive to Sunday service needs as captured in the onboard survey and stakeholder interviews.

Focus of Sunday Service Pilot Program Sketch Planning Working Paper #2

The focus of this working paper is to provide the preliminary analysis of four service delivery options for Sunday service in Shasta County. Sketch Planning provides order of magnitude estimates of demand and costs for alternatives being considered. It provides the general strengths and weaknesses of alternative approaches. For the purposes of the Sunday Service Pilot Project, it provides preliminary estimates on how each alternative performs against the nine specific criteria presented above.

The four service delivery options include:

1. **Baseline Sunday Fixed Route and Paratransit Option.** In this option, Sunday service would be provided in the same manner as the Redding Area Bus Authority (RABA) currently provides Saturday service for both fixed route and Paratransit services. This baseline alternative provides the business as usual service delivery scenario. It provides the baseline ridership and costs for operating Sunday service. Because the pilot Sunday service project is meant to provide an alternative "on-demand" service delivery solution for Sunday service, the fixed route option was not considered in the deliberation for a recommended Sunday service delivery.
2. **General Public Demand Response Service with an App Option.** Service would be provided throughout the defined Sunday service area through curb-to-curb, advance reservation and on-call demand response transportation. This service would be available to customers to engage via a smartphone app, a web-based application, and via a call to an agent. The smartphone app would have features similar to an Uber or Lyft app in terms of a map-based interface for the customer to book the trip, plus the ability for the customer to see the vehicle approach their location when it is a few minutes away from picking them up.
3. **User-Side Taxi Subsidy Option.** Use of a local taxi company and subscription service to an on-demand app. Passengers would pay the relevant $1.50 or $0.75 fare for a maximum $20 taxi ride.

The relevant fare of $1.50 or $0.50 would be for as many passengers as the vehicle allows with the same origin and destination. The taxi company would bill SRTA at an agreed upon schedule for the subsidy portion of the trip, on a per trip basis. An accessible minivan would be leased by the participating taxi company and would be available for trips seven days a week.

4. **Micro-Transit Option.** For the purpose of the pilot program, the service would be a hybrid of fixed, flex route and Paratransit service. Most passengers would be picked up and dropped off at designated RABA bus stops. Each bus cycle would have 3-5 scheduled stops at major activity centers. These scheduled stops provide the backbone of the service with the bus stopping at the scheduled stops at published times similar to fixed route service. In addition, passengers may request service at other bus stop locations by reservation via phone, website or smartphone application. The bus stop to bus stop service instead of curb to curb service is intended to maximize service efficiency. These other bus stop locations—the "unscheduled" checkpoints—will be dynamically generated by the technology used to manage the micro-transit service. ADA Certified passengers would receive origin to destination service to individual addresses in order to comply with ADA Paratransit regulations.

A preliminary recommendation of a service delivery option is provided in Chapter 4.

Four Service Options Not Being Considered Further

A total of eight service delivery options were evaluated in Working Paper #1. The four service delivery options described above will be included in the sketch planning for this working paper. Based on the screening of potential alternatives, and the meeting of the SRTA management, there was concurrence that the four service delivery options that will not be evaluated in this working paper include:

1. *Sunday Service on a limited set of RABA fixed routes.* In this option, the five routes that retain 80% of the productivity on Saturday as compared to weekday productivity (as measured by passengers per vehicle revenue hour) would be operated on Sunday. The primary rationale for eliminating this option is that it was felt the routes currently operating on Saturday were a better baseline fixed alternative to evaluate. A second important factor was the significantly reduced coverage of the option. Based on the recent RABA Short Range Transit Plan, a significant number of RABA passengers transfer to one or more buses to their final destination. By eliminating four routes, there would be significantly less coverage than the alternative with all routes that operate on Saturday.
2. *Four core RABA routes and three new circulator routes from Canby, Masonic and Downtown Transit Centers.* In this service delivery option, Routes 1, 9, 11, and 14 would provide the backbone of the fixed route service. Utilizing information from the onboard survey, three new Sunday circulator routes would provide service to and from the Canby, Masonic and Downtown Transit Centers. The primary reasons for not considering this option further is 1) it did not have

an on-demand feature and 2) like the above option, there was concurrence that having all routes that operate on Saturdays would be a better baseline alternative.

3. *Ride-Hailing Lyft and Uber Option.* In this service delivery option, Lyft and Uber would partner with SRTA and provide discounted rides on demand. It would be similar to the user-side taxi subsidy alternative, with riders paying $1.50 for a general fare and $0.75 for a discounted fare, and the pilot project funding would subsidize the balance of the ride up to $20 per trip. There are two factors that eliminated this service delivery option from further consideration. First, attempts by both Lyft and Uber to provide wheelchair accessible service have not been successful. The use of public funds for a Sunday service would require ADA accessibility for a wide range of persons with disabilities. Uber and Lyft cannot guarantee the availability of wheelchair accessibility in their peer-to-peer ridesharing platform. Secondly, an objective of the Sunday pilot program is shared rides. UberPool and LyftLine are available for multiple riders in highly urbanized areas like San Francisco but are not available in Redding. The lack of density of demand in the Redding will likely preclude the activation of Lyftline and UberPool in the Redding area for years to come.
4. *General Public Demand Response.* This is essentially the same alternative as the general public demand response with an app, but without the smartphone app. SRTA would like to explore utilizing a smartphone app to book a trip and track a vehicle. Therefore the general public demand response service without an app was eliminated from further consideration.

Overview of Working Paper

This working paper #2 builds on the results of Working Paper #1 Market Research for the SRTA Sunday Feasibility Study. A summary of the key findings of the Market Research effort is provided in chapter 2 of this working paper. Details of Sunday service demand estimation based on RABA Saturday service and a peer analysis is provided in Working Paper #1. Only the top level key findings of the analysis are reported. This is also the case for the onboard market research survey effort. The details of the onboard survey are reported in Chapter 3 of Working Paper #1. Only the most important key findings are brought forward for the reader convenience in Chapter 2 of this working paper.

Chapter 3 of this working paper is the evaluation of the four service delivery options, with information provided on the evaluation criteria for each as well as the relative strengths and weaknesses of each option.

Chapter 4 is a summary of the four service options with a comparison matrix. The chapter concludes with a preliminary recommendation for the service delivery option that would have a business plan with a branding marketing strategy.

2. Market Research Key Findings

This chapter summarizes the key findings on the market research effort that is fully documented in Working Paper #1. The key findings are summarized here for the convenience of the reader to provide context to the next chapter which provides the sketch planning on service delivery options for a Sunday service feasibility study.

Key Finding #1: Sunday Service has long been identified as an important unmet transit need, but it has continually been found that it is not cost-effective to provide the service with traditional fixed-route service.

In a 2012 onboard survey of 1,230 RABA bus riders, respondents to the survey were asked to rate the importance of potential service improvements. When asked to select only one from the potential improvements in service, 43% of respondents selected Sunday service for the top improvement. The next choice was extended hours, with 27% of respondents. The strong desire for Sunday service and expanded evening service often relates to the need to get to retail and service jobs with non-traditional hours. Riders were asked about their work schedules and their use of RABA to commute. Forty-three percent (43%) of employed riders work on Sunday.

Sunday transit services have been a long-standing unmet transit need identified in the unmet transit needs process. According to the SRTA 2017/18 Transit Needs Assessment, since 2002 a request for Sunday service has been asked for at least once during ten of the unmet transit needs cycles. Requests for Sunday service have consistently been found to be an unmet transit need.

In the annual unmet transit needs process, SRTA utilizes adopted criteria to determine if an unmet need is reasonable to meet. This includes that the proposed transit service can be operated with a minimum farebox recovery of 20% in urbanized areas and 10% in non-urbanized areas. The analysis conducted by SCRTPA (former name of SRTA) in 2011-12, for example, determined that Sunday service would have a farebox recovery ratio of less than 5%, falling well below the minimum farebox recovery requirements.

In the 2015/16 Annual Unmet Transit Needs Report, it was stated that Sunday service is an unmet transit need, but whether or not it was reasonable to meet was pending further analysis, providing the following recommendation/comment:

> *"In light of the public's request of Sunday service, more frequent buses, and expansion of service in RABA's Short Range Transit plan, as well as annually being recognized as unmet [transit] needs in SRTA's Transit Needs Assessments over the last 11 years, it is recommended that SRTA and RABA meet to explore ways of meeting these needs in the next Short Range Transit Plan. It is unlikely that*

changes could be made system-wide initially, but pilot programs could be introduced in high-use transit areas."

The current study "Sunday Service On-Demand Feasibility Analysis" is meant to explore the feasibility of implementing a pilot Sunday service in the near future.

Key Finding #2: If RABA were to operate all of its fixed routes and Paratransit service on Sundays, it could have a total of 1,078 to 1,431 Sunday riders, with the best estimate of approximately 1,250 passengers per Sunday.

Utilizing available 2015/16 RABA data, a detailed analysis was conducted in comparing average weekday Saturday ridership and productivity by route. A comparison of annual or daily ridership between weekday and Saturday service is misleading because Saturday service has 3 hours less of service than weekday service hours. A more accurate comparison is passengers per revenue hour of weekday versus Saturday ridership. Overall, comparing weekday and Saturday passengers per revenue hour, passenger productivity on Saturdays was 78% of average weekday productivity.

In order to determine what ridership might be for RABA operated Sunday service, to determine what the baseline demand might be, a peer analysis was conducted of seven transit agencies that have weekday, Saturday and Sunday service. It should be noted that the majority of small urbanized areas in California similar to the RABA service area do not have Sunday service. For the seven peer agencies, the passengers per revenue hour for Sunday service ranged from 75% to 105% when comparing Sunday productivity to Saturday service productivity. A conservative figure of 80% was utilized to determine the potential Sunday ridership if all routes operating on Saturday were also operating on Sunday.

The best estimate is that Sunday annual ridership would be approximately 1,250 passenger trips each Sunday, with a possible range between 1,078 and 1,431 if all RABA routes were operated, with the simple assumption that Sunday ridership would have 80% of Saturday ridership. Assuming Sunday service is operated 51 days a year, the best estimate is approximately 1,250 daily passenger trips each Sunday, including both fixed route and Paratransit service.

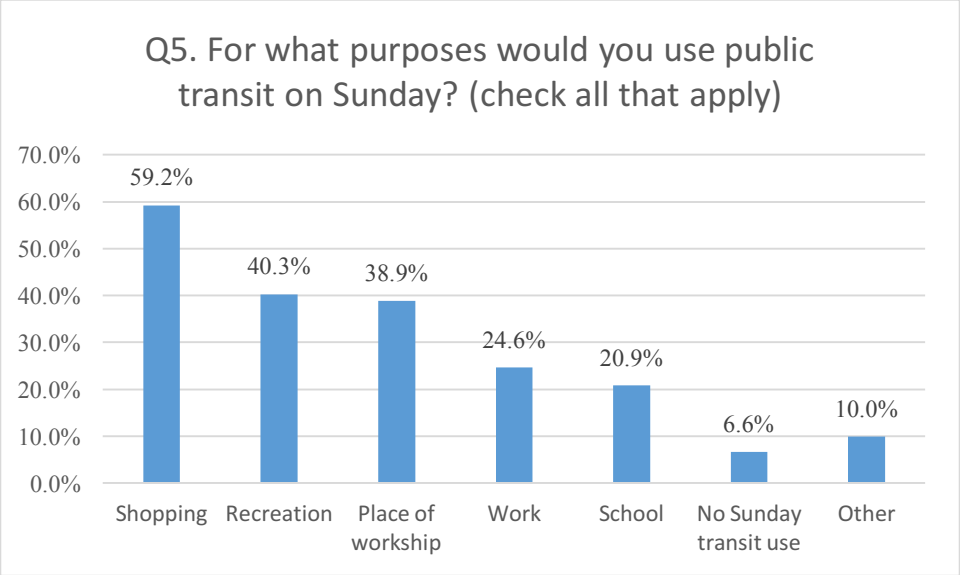
Key Finding #3: There is strong interest among current RABA riders for Sunday service.

The consulting team, in collaboration with SRTA staff, developed a questionnaire that was designed to solicit input from RABA passengers on 1) existing use of RABA services; 2) how passengers currently travel on Saturday; 3) potential utilization of Sunday service; 4) potential trip purposes on Sunday and the span of service needed for different trip purposes; 5) preferences for three service delivery and fare options; and 6) demographics and types of cell phone ownership of respondents. Surveyors distributed the questionnaires onboard RABA buses starting on October 30, 2017 during weekdays, with a combination of hard copy questionnaires in English and Spanish and a tablet version of the

questionnaire. All routes were surveyed at least once. A total of 219 completed questionnaires were received.

When asked "If public transit were provided in the Redding area on Sunday, realistically how often would you utilize it?" almost 59% of respondents said they would utilize Sunday service every week. About 90% said they would utilize Sunday service at least once a month, if not more frequently. Overall, there was a very strong interest among RABA riders for Sunday service. This strong interest validates the previous RABA survey for the Short Range Transit Plan and the unmet transit needs process requests for Sunday service.

Passengers would utilize Sunday service for multiple purposes, but shopping, recreation and attendance at places of worship were the top three trip purposes.



<u>Key Finding #4:</u> In giving passengers service delivery options with typical corresponding fares, there is a strong preference among existing RABA riders for fixed route service on Sundays; however, fare prices by mode likely had the biggest impact on how respondents answered the question.

Survey respondents were asked to provide input on the type of Sunday service they would prefer. The exact wording of the question and responses is repeated below. There was extensive discussion between SRTA staff and the consulting team on the how to describe a new service that riders were not familiar with and whether or not to include price differences.

> "**6. If a Sunday transportation service were provided in the Redding area, which of the following would you prefer? (check only one, seniors and eligible disabled individuals would have half fares).**

a. **A limited fixed route bus service** with special Sunday-only routes connecting major neighborhoods, shopping and church destinations. This would likely be 2-3 routes running on major corridors and serving only key destinations. The routes would run hourly and the fare would be $1.50-2.00 per trip.
b. **An on-demand 6-12 passenger bus service** that would pick you up and take you to your destination within the Redding area, sharing rides with other passengers. You would be able to make advance reservations or request an immediate trip. The fare would be $3.00-$4.00 per trip.
c. **A Taxi, Uber, or Lyft-type of service,** that would include sharing rides with other passengers along the way to your destination. You would call or use a smartphone app to request a ride. The fare would be between $3.00 for short trips and $6.00 for longer trips."

The limited fixed route service with a fare of $1.50 to $2.00 was the preference of almost 78% of the RABA passengers surveyed.

6. If a Sunday transportation service were provided, which of the following would you prefer?

	Count	Percentage
Limited fixed route, $1.50-$2.00 fare	144	77.8%
Shared ride, demand response $3-$4	34	18.4%
Shared ride, taxi, Uber, Lyft $3-$6	7	3.8%
Total valid responses	185	100.0%
No Answer	34	

While household income was not included in the questionnaire, the fact that 79% do not have a car available is an indicator of the degree that RABA users are dependent on RABA for their daily mobility. In the 2014 Short Range Transit Plan, the onboard survey conducted for the Short Range Transit Plan found that 74% of the RABA riders had incomes of less than $15,000 per year. It is very likely that respondents were very price sensitive in responding to this question.

In response to this key finding, it was determined that for sketch planning purposes the alternatives should use the same fare as the existing fixed-route service, with a baseline of $1.50 for the general public and $0.75 for elderly and disabled passengers for a single zone of travel.

Key Finding #5: There are an excellent array of potential service providers that could provide Sunday service in the Redding area.

During the consulting team's site visit in May 2017, the consulting team arranged to talk with potential interested service providers. Supplemental phone calls were also made to potential service providers, and some were not interested in providing Sunday service. There are four types of candidate service providers:

- Taxi services
- Paratransit service providers

- Ride-hailing services
- Micro-transit services

It must be stressed that these are companies that the consulting team contacted and indicated they were willing to consider participating in the potential Sunday service pilot program. Some companies contacted indicated they were not interested at the time of our inquiry and are not discussed. The contractor for the service may be selected in a competitive procurement process at the discretion of SRTA.

Redding Based Taxi-Companies

In discussion with owners of local taxi companies, there were two taxi companies who expressed interest in being a service provider for Sunday services. ABC Cab is a locally owned taxi company that has been in business since 1991. They have a fleet of eight minivans, with none of the minivans being wheelchair accessible. In general, they reported that having an accessible vehicle is not economical for them. However, they would be interested in exploring options for receiving assistance to operate an accessible taxi. They have 20 drivers for their taxi fleet. ABC has several contracts for ongoing services. They currently have a contract with Mercy Hospital to provide patient transportation home. Mercy provides them with an approved voucher. They travel within the Redding area but also Eureka and the coast on a regular basis, and occasionally to distant destinations in Oregon and Bakersfield, to mention a few.

Yellow cab has been in business for 37 years with a peak of six vehicles. It operates five Lincoln Town cars and one Lincoln Grand Marquis. They serve both the Redding and Red Bluff areas and any other city without entry restrictions. Dispatching is done through Redding Answering Service utilizing cell phones. Yellow cab currently does not have ongoing contracts, but historically has had contracts with senior housing complexes as well as medical facilities.

Paratransit Providers

Transdev is the contractor for operating the RABA service. Transdev is a global company with operations in 19 countries. Transdev contracts with cities, counties, universities and transit districts to both operate and maintain their transit systems. In addition to Redding, Transdev operates paratransit and non-emergency medical transportation contracts across the country including in Atlanta, Baltimore, Las Vegas, Phoenix, New Orleans, Long Island, Seattle, Kansas City, Greensboro, Washington, DC and Denver. For RABA, Transdev also operates Americans with Disability Act (ADA) Complementary Paratransit Service for persons with disabilities who cannot ride or navigate RABA fixed route bus service. Individuals who ride the RABA Paratransit service must have ADA Paratransit certification. The ADA Paratransit service is operated in compliance with ADA Paratransit regulations in terms of service hours, service area, and fares. Transdev drivers are licensed to provide ADA Paratransit service but are not licensed to provide general public demand response service. The general public demand response

service requires additional training and a different certification. RABA has issued a RFP for competitive procurement of the operations and maintenance contract. The decision as to who will be the future RABA operator will be made by September 2018.

Dignity Health Connected Living (formerly the Shasta Senior Nutrition Program (SSNP)) is the Consolidated Transportation Service Agency (CTSA) in Shasta County and has served in this capacity since 1995. A CTSA is designated by SRTA under the auspices of the Social Services Transportation Improvement Act to achieve the intended transportation coordination goals of that Act. Under Transportation Development Act regulations, the CTSA may receive up to 5% of available Local Transportation Funds. The CTSA can operate or contract for its own transportation services. SRTA has developed detailed policies to enhance coordination efforts in Shasta County. Dignity Health Connected Living provides services to seniors 60+ and those with disabilities primarily for residents living outside the RABA service or to individuals who do not qualify for RABA services. Able-bodied seniors 60 and over, for example, are not eligible for Paratransit service unless they have a disability that makes them eligible for the Paratransit service. Dignity Health Connected Living has six vehicles and operates four vehicles in peak service.

Ride-Hailing Providers

Uber and Lyft started in more urbanized areas and slowly implemented services in small urbanized areas similar to Redding. Although it not known officially when Lyft and Uber started in Redding, when the consulting team utilized both Uber and Lyft during the team site visit, the drivers indicated that in 2016 it became a viable mobility service in the Redding area. About 50% of the RABA riders surveyed towards the end of 2017 had utilized Uber, Lyft or both. Similar to a taxi services, UberX and Lyft in Redding provide service from a single origin to a single destination. Lyft and Uber have been partnering with local cities to provide discounted rides. Since most riders in the onboard survey were with Uber, discussions were held with an Uber representative. There are essentially two ways that Uber structures financial partnerships with public agencies. The first is a fixed dollar subsidy, where the transit agencies pays the first $5.00, for example, for the ride. If the Uber total ride cost were $10.00, the passenger would pay $5.00 and the transit agency would pay $5.00. The second typical financial arrangement is the "Variable Percentage-Based Discount" according to discussion and materials received from Uber. In this financial arrangement, the transit agency subsidizes, for example, a "50% subsidy up to $7.00." If the Uber total fare was $8.00, then the passenger would pay $4.00 and the transit agency would pay $4.00. If the Uber total fare was $20.00, then the transit agency would pay $7.00 and the passenger would pay $13.00. Uber then invoices the transit agency monthly for the balance due.

Other potential service providers were contacted and either did not respond or declined to participate in the feasibility study analysis and are not included in the discussion above.

<u>Key Finding #6:</u> There is a growing array of software providers that provide on-demand apps to book a ride, track a trip, and provide payment utilizing a fleet of taxi or wheelchair accessible demand response vehicles.

There are new software vendors that have been promoting a software platform to essentially enable general public Dial-a-Ride utilizing the transit agency's own vehicle or a vehicle provided by the vendor where booking, vehicle tracking to pick-up, and payment for the trip is completed through an app. These demand response services with a modern app are typically called "micro-transit" services.

There are several vendors that provide these types of services. TransLoc's software for its micro-transit product originated from the many universities it serves with a safe ride home program from the university to home late at night. TransLoc provides a service whereby their software enables passengers to essentially have an Uber or Lyft ride, but with transit agency owned vehicles. Their app enables passengers to book a ride by inputting their requested pickup time, with the choice of the next available time or a future date and time. The passenger selects the pickup location by typing in the address or utilizing the GPS "Your location". The passenger then chooses the drop off destination, orders the ride and confirms it. There is the option of scheduling or cancelling the ride by phone. The app will then provide a notice to the rider when the vehicle will arrive. They provide the software for a turnkey operation for a typical six-month pilot project. They utilize Stripe for fare payment processing. An example of this service is the recent launch of service in Citrus Heights in the Sacramento Regional Transit District. Service is being provided from 7 am to 7 pm Monday through Friday.

A second potential vendor for this service is through VIA. VIA is best known for its shared ride service in New York City. VIA will provide its software for transit agencies to operate their own micro-transit service with the use of agency vehicles. In Austin, Texas, the Capital Metropolitan Transportation Authority operates the Pickup service utilizing the VIA Platform. According to VIA, ridership grew by 60% and vehicle utilization improved by over 60%. They are also operating a similar service in Arlington, Texas. VIA is in the process of launching a new micro-transit service for local trips within West Sacramento.

Examples of a flex route utilizing micro-transit software are two areas in the AC Transit service area: in Newark and Castro Valley. In this AC Transit Flex service, the service is offered in a designated service area that includes a BART station. The cost to ride Flex is the same as any other local AC Transit local bus service. For example, in Newark, pick up and drop off locations are at selected bus stops within the service zone, including the Union City BART station. The stops are clearly marked by the Flex logo. Newark Flex leaves the Union City BART station every 30 minutes and passengers are dropped off at one of the designated stop locations, depending on the passenger destination. While reservations are required for all other trips, passengers can board the Flex route without a reservation at the BART station. Passengers book their trip utilizing DemandTrans software. When booking the trip, passengers select their arrival and departure times to and from designated Flex bus stops. Passengers can also ride

from one bus stop to another bus stop in the service area or to and from the BART station. The software notifies the passenger ten minutes in advance by email or text when the vehicle will arrive at the pick-up bus stop location.

There are also software platforms like Curb and iCabbi that enable taxi companies to subscribe for booking and tracking the vehicle through an app.

3. Sketch Planning of Alternatives

Sketch planning provides order of magnitude estimates of demand and costs for alternatives being considered. It provides the general strengths and weaknesses of alternative approaches. For the purposes of the Sunday Service Pilot Project, it provides preliminary estimates on how each alternative performs against nine specific criteria that were presented in Chapter 1. Since the data available for existing services was 2015/16, the cost comparisons are in 2015/16 dollars. Once a specific alternative is selected for production of a business plan, the numbers will be updated to 2018 dollars.

Key Analysis Assumptions

There are several key assumptions that have been utilized in the analysis. The focus of the sketch planning is to determine the service supply in vehicle revenue hours and determine the directly operated cost. This is essentially the cost of actually providing the service. The administrative costs for RABA, for example, are those costs to manage and administer RABA. The marginal costs to administer RABA on Sundays would be very different than the administrative costs that would be needed for example to administer a user-side taxi program by SRTA. In order to normalize the operating costs of each service delivery option, a standard $65.00 per vehicle revenue hour is utilized for the sketch planning analysis and comparison. This is only the cost of directly operating the service. It does NOT include administrative costs, start-up costs, or software licensing fees.

The farebox recovery ratio reported in each of the service delivery options is only for the directly operated costs and is higher than what the farebox recovery ratio will be when the administration and software licensing fees are included. For the three "on-demand" service delivery options, start-up and software fees are identified but are not included in farebox recovery calculations. In Task J Business Plan, the details of the administrative costs will be determined for the selected service delivery option that will enable a more accurate determination of expected farebox recovery ratio. This would allow exclusions such as the cost of insurance.

In Chapter 4, where the four service delivery options are compared, a standard administrative and management fee is assumed to provide a preliminary estimate of a more realistic farebox recovery ratio that include the administrative and ongoing software costs.

Option #1: Fixed Route on Sundays

In this alternative, Sunday service would be provided in the same manner as the Redding Area Bus Authority currently provides Saturday service for both fixed route and Paratransit services. This baseline alternative provides the business as usual service delivery scenario.

Fixed Routes Included: Routes 1, 2, 3, 4, 5, 6, 7, 9, 11, 14 and Airport Express would provide service on Sundays. On the next page, a map shows the fixed routes that would operate on Sundays.

ADA Paratransit Service Area: Would remain the same as the ADA Paratransit service area for weekday and Saturday service.

Fares: The existing fares for the fixed route service would be maintained with $1.50 for One Zone and $0.75 for each additional zone. The senior and disabled fares would be maintained at $0.75 and $0.35 for each additional zone.

Span of Service: The span of service on Sunday would be the same as Saturday service for this base case scenario, generally starting three hours later than weekday to when the weekday service ends on most routes at 7:15 pm.

Institutional Management: In this alternative, SRTA would contract with RABA to operate Sunday service exactly the way Saturday service is currently operated.

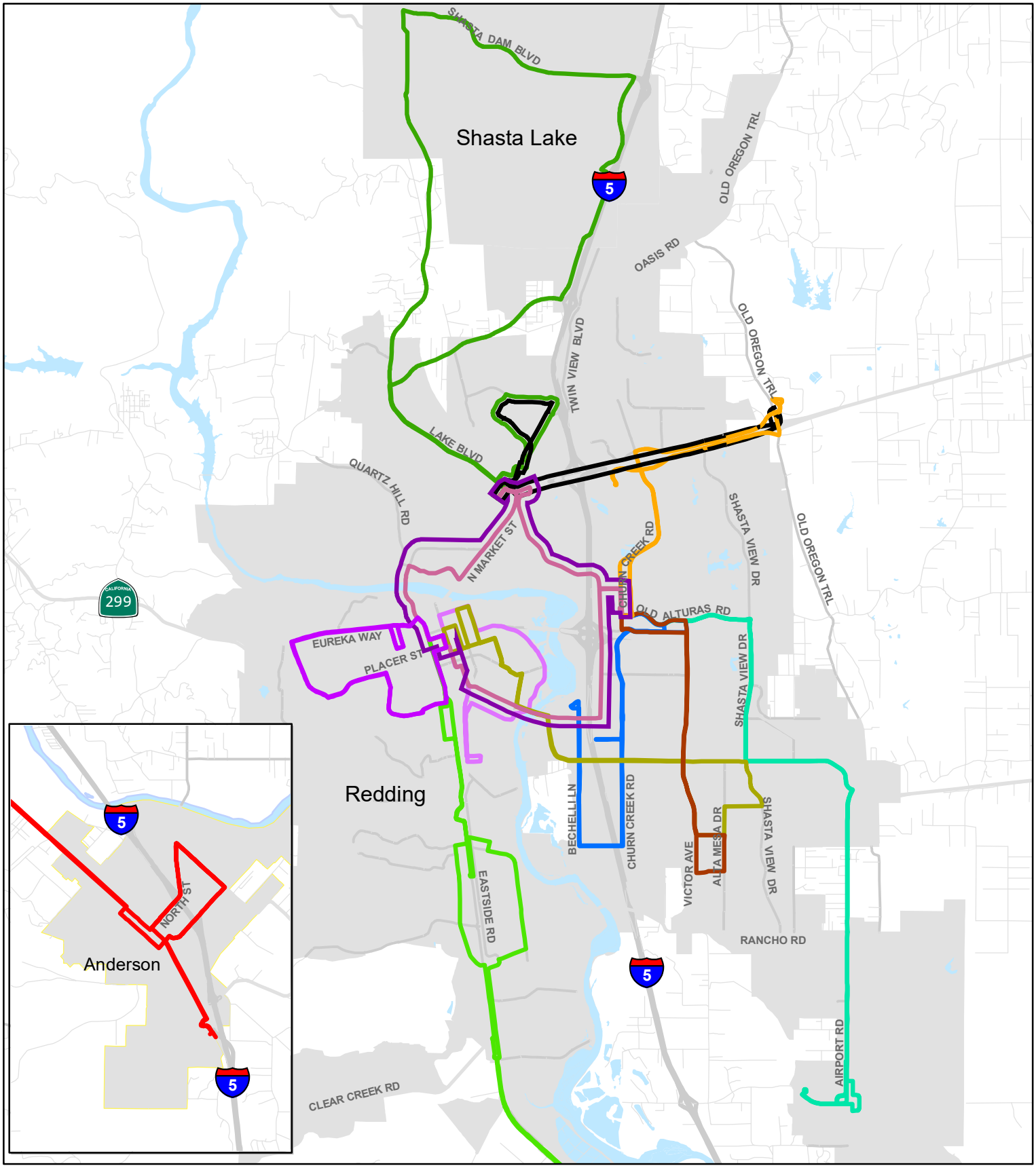
Accessibility: All RABA buses have at least two wheelchair securement positions. Bus stops are mostly up to ADA standards for getting on and off the buses utilizing a wheelchair.

App Considerations: In this alternative, real time bus arrival information could be available on one or more of several popular transit apps, including the Transit or Swiftly apps.

Potential partnership opportunities: In order to offset the difference between the weekday and expected Sunday farebox recovery, partnerships with key churches and other activity centers could be provided as a local contribution. The pending agreement between RABA and Bethel may provide a future revenue source for this purpose. There may other opportunities for other partnerships.

Market Research Input: 78% of the onboard survey respondents preferred to have a fixed route service with the same fares as currently exist. Based on the stakeholder interviews and the onboard survey, the span of service from 9:15 am to 7:15 pm would not meet the span of service needs of existing RABA passengers. Based on the onboard survey results, Sunday service should have a span of service that is more similar to weekday service.

Sunday Fixed Route Option



Airport Express
Route 1
Route 2E
Route 2W A and B
Route 3
Route 4
Route 5
Route 6N
Route 6S
Route 7
Route 9
Route 11
Route 14

Source: City of Redding and Shasta County
March 2018

0 1 2 4 Miles

N

Preliminary Review of Performance Criteria:

- Farebox Recovery Ratio: For direct costs only at $65 per vehicle revenue hour, fixed route between 15.9% and 20.4%. Paratransit between 13.1% and 16.8%. Combined farebox recovery ratio between 15.4% and 19.6%. With administrative costs, the farebox recovery ratio would be lower.
- Sunday Service Subsidy Costs: For directly operated costs, the total cost could range from $447,500 to $481,000. The subsidy required, subtracting anticipated fares, would be between $379,00 and $387,000.
- Shared Ride Potential: Fixed route passengers per vehicle revenue hour of between 9.5 and 12.1. Paratransit productivity between 2 and 2.8 passengers per vehicle revenue hour.
- Average Daily Ridership: Between 1,093 and 1,433 riders that includes both fixed route and Paratransit ridership.
- Vehicle Miles Travelled: Very low compared to other non-fixed route alternatives. The vehicle miles travelled are essentially the vehicle service miles on each of the routes operated.
- Responsive to Sunday Needs: Survey respondents are used to Saturday service and have a high preference for Sunday service similar to the Saturday service according to the results of the onboard survey. However, the 9:20 am start time would not meet many of the needs for worship services and work. Sunday service would need to start by 7:00 am to meet many of the transit needs expressed in the onboard survey.
- ADA Accessibility: Based on ADA regulations, all RABA buses have at a minimum two wheelchair stations. RABA is in full compliance with ADA regulations.
- Coverage Impacts: This alternative operates the same routes with the same Paratransit service as on Saturdays. It has no impact on coverage.
- Relative Travel Time: In comparing six origin and destination pairs, fixed route bus service travel time was on average 15 minutes slower per one-way trip than the demand response with an app option. Fixed route bus service is on average 27 minutes per trip slower than the taxi option. We are utilizing a sample trip from Loma Vista Apartments at 3980 Churn Creek Rd. to In-N-Out Burger at 1275 Dana Drive. There is a bus stop at Churn Creek Creek Rd. at Loma Vista Rd. It takes 2 minutes to walk from the apartment complex to the bus stop, three minutes of wait time for the bus, 30 minutes of travel time and a two minute walk to the In-N-Out Burger for a total travel time of 37 minutes.

Factors Contributing to Performance Variance

In Working Paper #1, the weekday, Saturday and Sunday performance was compared for five California small urbanized areas that have Sunday service. In addition, the Sunday service of two larger transit agencies were compared. As stated earlier, Sunday ridership compared to Saturday ridership ranged from 75% to 105%. At the lower end of the range, Santa Maria averaged 6.9 passengers per hour compared 9.2 passengers per hour on Saturday. At the high end of the range, Yolo Transit District in the

Woodland, CA area averaged 14.3 passengers per hour on Sundays compared to 13.7 passengers per hour on Saturdays. The range in ridership demand reflects a reasonable range of productivity for Sunday service in the RABA service area, from 70% to 90% of average Saturday ridership. This equates to an estimated fixed route productivity from 9.5 to 12.1 passengers per revenue hour on Sundays. In FY 2015/16, the average passengers per vehicle service hour was 13.5 for Saturdays and 17.2 for weekday service.

Ridership productivity is directly correlated to farebox recovery ratio as the same average fare for FY 2015/16 for Saturday service was utilized for Sunday service. Therefore, the range of farebox recovery ratio for Sunday service, due to expected lower productivity, would be in the range of 10.6% to 13.5%. For comparison purposes, Saturday farebox recovery ratio in FY 2015/16 was 15.3% and weekday farebox recovery ratio was 19.4%.

Summary of Primary Benefits

The primary benefit of this alternative is that it would be responsive to long-term desires of existing RABA passengers to have Sunday service equivalent to Saturday service. Having fixed route Sunday service was the top improvement of passengers in the RABA SRTP and continually among the top improvements expressed in SRTA's annual unmet transit needs process.

The fixed route service delivery option would have the highest average daily ridership compared to the other service delivery options. The fixed route option would have the highest degree of shared rides, with an average for both fixed route and Paratransit of 8.8 and 9.9 passengers per revenue hour. With the standard $1.50/0.75 fare structure for all options, it would also have the highest farebox recovery ratio of any service delivery option. If the marginal administrative costs for Sunday service were priced at the same as the other three service delivery options at $20,000 annually, the farebox recovery ratio would be between 14.7% and 18.8%.

Summary of Strengths and Weaknesses

<u>Primary Strengths:</u>

- Strong existing RABA passenger preference for fixed route service equivalent to Saturday service would likely be the strongest argument for implementing fixed route service.
- The fixed route service with Paratransit for disabled individuals who cannot utilize the fixed route service is familiar to RABA passengers. It would be the most easily understood service alternative.
- The fixed route alternative would have the highest daily ridership of any of the other service delivery options, ranging from 1,093 to 1,433 daily passengers. Even at the low end of the projected productivity range at 9.5 passengers per vehicle revenue hour for fixed route service,

the shared ride potential is substantially higher than the micro-transit alternative with a range of 3.6 to 6.0 passengers per revenue hour.

Primary Weaknesses

- The fixed routes are primarily designed for weekday travel patterns. The existing fixed route services are not designed, for example, to conveniently serve places of worship.
- The onboard survey found significant demand levels for attending places of worship and work trips before 9:15 am. This alternative does not serve the earlier morning Sunday trip demands well.

Option #2: General Public Demand Responsive Service with App

Description of Service Option: Service would be provided throughout the defined Sunday service area through door-to-door, advance reservation and on-call demand response transportation. This service would be available to customers to engage via a smartphone app, a web-based application, and via a call to an agent. The smartphone app would have features similar to an Uber or Lyft app in terms of a map-based interface to the customer to book the trip, plus the ability for the customer to see the vehicle approach their location when it is a few minutes away from picking them up. In concept, mobile ticketing could also be part of this app if SRTA wished for that option to be available for customers. The customer could purchase their ticket at time of booking or later. The mobile ticket would be displayed on the smartphone screen within the app and the driver would visually verify it when the customer boards the vehicle.

In terms of how this service would operate, it is essentially the same as a general public demand response service in which all service requests are taken via the telephone. This service could accept advance reservations for certain types of trips or operate entirely as an immediate-request, space available service. Subscription reservations are also feasible if SRTA wishes to allow them. This would be quite useful for trips to and from churches, where services and other activities are on a predictable and consistent schedule. While a base level of service should be available from the start-of-service time to closing, the availability of service can be adjusted by adding and removing vehicles from service, thus matching service capacity to trip demand, though not generally on a daily or short-term basis due to staffing requirements and labor agreements. For example, additional vehicles could be added during peak periods.

One advantage of general public demand response service over the operation of fixed route transit is that complementary ADA Paratransit service would not be required. So long as individuals with disabilities have the same availability of fully-accessible service as that provided to non-disabled

individuals, complementary ADA Paratransit would not be required. The provision of door-to-door service upon request would ensure the accessibility of these services to all riders.

Operation of these demand response services could be by the Redding Area Bus Authority as an extension of their current services or contracted through an open, competitive procurement to another private for-profit or private nonprofit operator. If RABA were the operator, this service could be operated using the existing fully-accessible Paratransit fleet, whereas contracted services would require the SRTA to provide suitable accessible vehicles or look to the contractor to provide such vehicles. As was pointed out in an interview with Transdev, the current operations vendor for RABA, they do not have GPPV licensing and their paratransit software is not set up for general public Dial-a-Ride services, both of which would be constraints to the operation of such service by RABA through their present service/management contractor. The provision of vehicles for this Sunday-only service would most likely be cost-prohibitive unless the prospective service/management contractors already possess such vehicles for use in other programs or the current RABA vehicles were able to be utilized via some sort of creative sub-leasing (for one day per week) arrangement. In sum, the GPPV licensing for general public dial-a-ride, existing paratransit software, and provision vehicles could be a constraint to implementation or reduce the number of potential bidders.

Dignity Health Connected Living could be a possible vendor for this service, but with a total fleet of just six vehicles, with fares of $1.50/$0.75, this may not be a sufficient fleet to operate the service. We are projecting a need for seven vehicles to operate in RABA's current service area Zone 2, as the map later in this section indicates. If this option proceeds to the development of a business plan, then steps would need to explore how Dignity Health Connected Living could utilize other accessible vehicles on Sundays. A shared use agreement with RABA for use of two Paratransit vehicles on Sundays is one possibility. If this is not feasible, then the business plan would suggest a higher base fare of $2.00 or $2.50 per fare to effectively reduce the demand. During the stakeholder interviews, Dignity Health Connected Living management was interested in further exploration of the terms necessary to operate Sunday service.

There are three important advantages to SRTA and its partners of this general public demand response transit (DRT) option compared to the more traditional DRT in which customers book trips via telephone calls. First, we believe that the service will be somewhat more attractive to customers due to the technology features that make it easy for customers to book trips themselves. This could attract riders who currently do not utilize RABA services. We conservatively estimate that it will generate 5% more passenger usage than a service that does not have self-service booking including via a smartphone. This is based on actual operating experience of similar demand response services in the Denver and AC Transit service areas, discounted for the origin and destination patterns in a lower density operating environment. Second, the use of the app-based and web-based booking capability could induce as many as 70% of the customers to book the trips on their own based on experience at AC Transit, without the use of a call center agent. This means that perhaps a single agent, and no more than 2 agents, could handle all phone-based trip booking, thus reducing operations costs compared to the non-app based

service. Third, some of these more advanced DRT technology platforms feature fully automated dispatching for small systems—and the Redding Sunday service would be of that size. This means that no dispatcher would be needed, only a supervisor (or a supervisor who could also act as a second phone agent when necessary). This would also reduce operating costs compared to the other general public DRT option. We estimate that these features could reduce operating costs by 5% compared to the DRT service without fully automated technologies for customer booking and vehicle/trip dispatching.

Please note that the Project Manager contacted both TransLoc and VIA who are possible vendors for providing the software technology and app for such a service. TransLoc operates similar service in the Citrus Heights area and VIA is operating service in the fringes of the Austin Texas area. These are general public services with many origins and many destinations, similar to what this service scenario envisions for Sunday services. Both were asked about the actual productivity and ridership potential compared to general public Dial-a-Ride. Both companies said the pilot programs they have launched in other areas are too new and they were not willing to share the productivity and performance of the pilot projects. Therefore, there is considerable uncertainty about whether or not a 5% increase in ridership performance compared to traditional general public demand response service can be achieved.

Institutional Management: Based on discussions with SRTA it is anticipated that management and operation of the service wiykd likely be conducted in partnership with Dignity Health Connected Living (DHCL). DHCL is the current Consolidated Transportation Services Agency (CTSA) provider for the region. DHCL has the availability to participate in the pilot project. The existing contract between SRTA and DHCL has provisions for partnering on pilot projects like the Sunday transit. The Final decision to partner is up to the SRTA Board of Directors.

However, if a partnership between SRTA and DHCL is not feasible, management and operation of this demand responsive service could be carried out by SRTA through a competitive procurement process. A competitive procurement of this type will need to be initiated at least 6 months prior to the intended start-of-service date, with development of the procurement and scope of work documents preceding that. Timing of this procurement depends on many factors, including responsibility for providing the necessary vehicles and equipment, facilities, communications and technology, and, not the least, that this will be a brand new service lacking on-going public information, employees, and service structure.

Potential proposing firms and organizations might include regional and local transit management companies, local charter and for-hire bus operators, and nonprofit organizations with existing transportation capabilities. From a business standpoint, however, interest in this project will be limited by the fact that the service will operate only a single day each week, the GPPV licensing requirements, and general public demand response software requirements. If the successful contractor is also required to provide the necessary accessible transit vehicles, this likely will limit the number of prospective management firms further.

Once a management firm is selected, the Shasta Regional Transportation Agency will assume a continuing project management role throughout the life of this service. This management role includes monitoring of service delivery; receipt, review and payment of invoices; service planning; and public information/marketing. This management function will require some dedicated headcount or staff resources. If this option is selected to go forward with the business plan in Task J, these costs would be identified.

Technology Considerations: The technology system that manages this new service will be a critically important element in how well it functions and how it is perceived by prospective and actual customers. It is strongly recommended that SRTA procure the technology system separately from the operations management contract, as otherwise it may limit the available technology vendors, or the most cost-effective operations contractor might propose a technology system that SRTA would not prefer. By separating these procurements, SRTA is most likely to obtain the technology system that best fits its needs and objectives for this type of service.

There are several organizations which have developed technology platforms that manage DRT and micro-transit services for public transportation and which feature customer-facing apps. These include VIA, Transloc, DemandTrans Solutions, RideCo, and DoubleMap, among others. Trapeze and RouteMatch may also soon have offerings for these types of services. The technology approach for all of these vendors is similar. The technology platform includes a customer-facing smartphone app, a web-based booking (reservations) application, an automated scheduling system that optimizes the amount of shared rides within certain customer service constraints, usually a fully automated dispatching system (some may also include manual dispatching capabilities), and a driver application running on a tablet computer or smartphone (usually the former). The driver application—which communicates with the computing infrastructure via cellular data connections to the Internet—is very frequently updating the status and position of the vehicles for the scheduling and dispatching systems so they can react in real-time to the ever-changing configuration of the service. There may also be a mobile fare payment/ticketing capability that is part of the customer app. The technology system runs in the "cloud", on remotely hosted computing infrastructure (e.g., Amazon Web Services, Microsoft, Google), and access by all users of the system to its functionalities is via the Internet.

The technology system is typically "purchased" on a software as a service (SaaS) basis. There will be various fees to setup and configure the system for SRTA's specific needs, and then a periodic fee that represents a combined usage, hosting, and system support cost. There is no direct licensing fee for the technology system but instead a "rental" fee for the use of the software. SaaS fees are typically for a minimum contract term of 12 months and paid on a monthly basis. This makes switching to a new technology system a much less complicated and risky proposition than the older model of licensed software hosted on computing facilities controlled directly by the operator or the vendor. However, purchase of this software for only Sunday service makes the software costs per day very high. Most transit agencies when investing in such software typically utilize it a minimum of five days a week.

Service Area: The proposed service area for a general public demand response pilot would be limited to the current RABA Zone 2, which encompasses the primary trip origins and destinations identified by respondents to the survey conducted for this study. The map on the following page shows the preliminary service area boundary. It is proposed that the service area be operated during the pilot as a single large area which could be divided into zones if warranted by travel patterns and trip volumes in a second phase. If a zonal approach were used, transfer of riders between zones could take place at the RABA Downtown Transit Center, the Canby Transfer Center or the Masonic Transfer Center. A zonal system has the advantage of providing more timely service to requests within a zone with the accompanying disadvantage of requiring transfers for any trip between zones.

Preliminary Fares: Flat fares of $1.50 and $0.75 for seniors and disabled individuals would be charged for the demand response service with an app. These fares are the same as the current one-zone fixed route fares on RABA and significantly less than the RABA fares for Paratransit services. At these fares, it is conceivable that this service will experience excessive demand for trips during peak travel periods. This is why a minimum fleet of eight demand response vehicles with a peak of seven vehicles in service would likely be required.

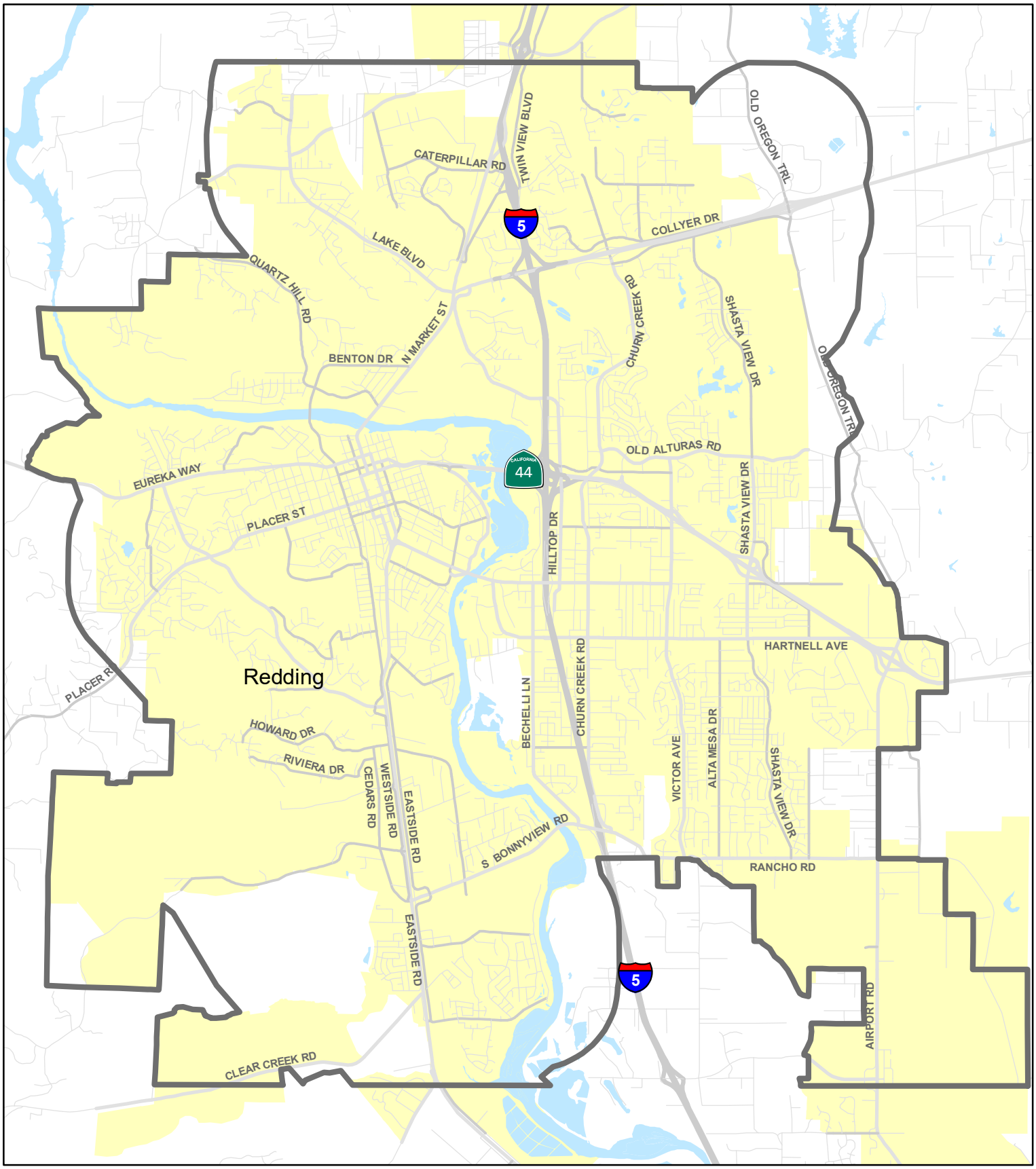
However, it should be noted that the ridership response to this low fare structure with an app to make real time reservations is very uncertain.

Span of Service: Demand response service would be provided during the hours when the community has expressed desire for transportation for church, shopping and recreation trips. This would be from 6:30 am to 7:15 pm. The amount of service to be provided could vary during the day.

An average level of service equal to five vehicles has been proposed, but the number of vehicles actually in service would be expected to vary from probably a minimum of two vehicles at very low demand periods to a "peak" fleet of seven vehicles. It could be the case that demand is lower than anticipated and fewer vehicles will be necessary, but a minimum fleet size of eight vehicles (including at least one spare) to start seems prudent based on the strong RABA ridership on Saturdays and the low proposed fare structure. A fleet of nine vehicles would be desirable.

Accessibility: Demand response service could be operated with a fleet of fully accessible ADA paratransit vehicles or with a mixed fleet of accessible vehicles and ambulatory-only vehicles such as sedans so long as an individual requiring an accessible vehicle does not experience a longer wait time for a pick-up than any other passenger. Additionally, if the vehicles are purchased by a public entity, only fully-accessible vehicles could be purchased.

Sunday General Public Demand Response with an App Option



Service Area Boundary

Source: City of Redding and Shasta County
March 2018

0 0.5 1 2 Miles

N

While it recommended that the general public demand response service with an app provide curb-to-curb service generally, door-to-door service could be offered to individuals who are ADA Paratransit certified to ensure the accessibility of this service.

Potential partnership opportunities: As mentioned with other service options, partnerships with key churches and other activity centers are a possibility to offset the difference between the weekday and expected Sunday farebox recovery. A partnership arrangement, for example, could schedule a regular group trip at an established time each Sunday from a single origin address or a series of addresses to a single destination and then a return trip at a set time. As noted previously, most technology systems will support subscription (standing order) trips. Payment for such group standing-order trips could entail a per passenger fare with a minimum group fare per trip {for example, $1.50 per passenger with a minimum group fare of $15.00].

Market Research Input: Demand response with an app service does not directly respond to the expressed preference of 78% of the onboard survey respondents to have a fixed route service and fares similar to existing RABA services, but does offer accessible and convenient transportation across a larger portion of the RABA service area than the fixed route or checkpoint options. Fares for this general public demand response service are proposed at $1.50 per trip for general public and $0.75 for seniors and disabled for the service on Sunday.

Sunday Service Start-Up Costs and Software Fees: Acquiring the technology platform for this service is estimated to cost $25,000 in planning, setup, configuration, and training costs, and software as a services fees of $3,000 per month, or $36,000 annually.

Preliminary Review of Performance Criteria:

- Farebox Recovery: Demand response service (DRT) with an app operating in the core RABA service area for the entire day on Sunday is projected to have an annual Sunday ridership of somewhat more than 336 daily Sunday trips, ranging from a low estimate of about 239 daily trips to a high estimate of 446 daily passenger trips. In comparison, current fixed route RABA ridership on Saturday is 1,333 daily passenger trips, or about four times the medium estimate for DRT on Sunday. So this ridership estimate appears plausible but has a high degree of uncertainty. In particular, a low fare of $1.50 for DRT is not typical and there are no known benchmarks from other areas to gauge the potential ridership response. The preliminary farebox recovery ratio for direct operating costs only is predicted to be 7.7%, ranging from 5.5% to 10.2% depending on ridership level.
- Total Sunday Service Subsidy Costs: A general public demand response service with an app would have an annual operating cost of approximately $251,000 to $282,000 and, based on the

projected farebox recovery above, a total subsidy cost – or net cost – of between $225,000 and $237,000.

- Shared Ride Potential: This service option has a high opportunity for realizing shared riding during peak service hours, but can expect to experience many single, one-to-one trips during low demand periods. Incentives may be possible to encourage shared-riding by groups. The projected passengers per revenue hour is between 3.2 and 5.25.
- Average Daily Ridership: Based on the mean projected average hourly productivity of 4.2 passengers per vehicle service hour on the demand response service, this service option is projected to transport from about 239 to 446 trips on an average Sunday.
- Response to Sunday Service Needs: This service option accommodates most of the transportation needs expressed in the onboard survey and stakeholder interviews with the exception of a preference for fixed route service. Specific travel needs that would be met by demand response service include: need for early morning and evening work trips and provision of service to Downtown Redding, Hilltop Drive and Mt. Shasta Mall.
- Vehicle Miles Traveled: Based on an average operating speed on the demand response service of 15 miles per hour, which is typical for demand response services, this service option is estimated to result in a total vehicle miles traveled of approximately 58,000.
- ADA Accessibility: As a general public demand response service, this service is considered to be fully accessible – even if not all vehicles are fully-accessible – so long as an individual who requires a fully-accessible vehicle is served without any more delay than the typical customer. No special service provisions are envisioned for ADA paratransit eligible individuals.
- Coverage Impacts: During at least the demand response with an app pilot, service will only be available in RABA Zone 2. Following the pilot, a decision will be needed on providing service to Zone 1 and 3.

Relative Travel Time: For six sample trips, demand response with an app had an average of 15 minutes less travel time than the baseline fixed route alternative. The estimation of travel time for the Demand Responsive w/App option accounts for wait time before the passenger is picked up, the circuitous routing of a demand response vehicle as opposed to direct origin-to-destination travel, and the added time of picking up and dropping off other passengers while traveling to one's specific destination. For the example trips, which was a trip from the Loma Vista Apartments [3980 Churn Creek Rd. Redding] to In-N-Out Burger [1275 Dana Dr. Redding], the estimated travel time of 31 minutes includes the following factors:

Wait Time: A wait time of 15 minutes, which is common is general public demand responsive services, has been used to approximate the time between the passenger's use of the App to request a trip or, if making their request by phone, the time from completion of the phone request until the vehicle arrives at the pick-up location;

Circuitous Routing: The direct-routing distance between the origin and destination is this comparison trip is 3.2 miles. To account for other pick-ups and drop-offs , the direct-routing distance has been increased by 25 percent, from 3.2 to 4.0 miles; and

Additional Travel Time for Other Passengers: In addition to added travel distance, shared riding also adds to travel time while other passengers are boarding and alighting the demand response vehicle. To account for this time in the travel time comparison, an average vehicle speed of 15 miles per hour has been used, which is a common overall speed in similar services.

Summary of Primary Benefits

- Would provide basic but comprehensive transportation service throughout RABA Zone 2 at passenger fares identical to the existing RABA fixed route one-zone fare.
- This service would be fully-accessible and would not require a separate ADA paratransit service.
- Service can be structured to accommodate both a smartphone App and also accept requests for service by regular phone service.
- App-based services may have more customer appeal than conventional general public demand response service and could result in greater usage and higher farebox recovery ratio.
- Technology platform provides many options for service modifications and re-configurations to better serve public and/or improve cost-effectiveness of service.

Summary of Strengths and Weaknesses

Strengths:

- Service is convenient to access and use.
- Although capacity may be limited, service would be available throughout RABA Zone 2.
- Easy to reconfigure service to improve service outcomes if necessary, with appropriate technology platform the service can be precisely tailored to needs and opportunities.
- Demand response transit service can be morphed into other types of flexible transit services if that appears desirable (see the micro-transit option #4 below).
- Overall, this on-demand service would be easy for existing RABA passengers and potential riders to understand.

Weaknesses:

- Pilot would not provide Sunday transportation within RABA Zone 1 (Shasta Lake) and Zone 3 (Anderson).

- Ridership potential is constrained by the demand response nature of this service although there is a high potential for shared riding with the low fares of $1.50 and $0.75 for seniors and the disabled.
- At the proposed passenger fares this demand response service achieves fare recovery ratios of less than 10 percent unless ridership exceeds expectation.
- Compared to existing demand response service, requires a specific request for service either by phone or an App.
- The need for GPPV licensing of drivers could be a barrier to implementation of Sunday only service.
- While demand is highly uncertain, the low fares and access to service with a smartphone app could require up to seven peak vehicles in service.

Option #3: Taxi User-Side Subsidy Option

Taxi user-side subsidy programs have been utilized in the public transportation industry for many years to supplement public transportation services. The most common model is that an agency contracts with one or more taxi providers in the service area. In typical user-side subsidy programs, the passengers pay the driver for half of the subsidized amount and the taxi company invoices the agency for the 50% subsidized amount each month. The invoice to the agency is based on the number of trips taken and the subsidized amount by trip. This is in stark contrast to a general public demand response service where the operating costs are based on the revenue hours and/or revenue miles that a dedicated vehicle puts into service. As discussed in more detail below, for the purposes of the pilot project for Sunday Service in Shasta County, to test the concept, one passenger in the taxi would pay $1.50 for a taxi ride up to $20.00 or $0.75 registered with RABA as being eligible for the disabled fare. SRTA would subsidize the balance, up to $18.50 per trip. If multiple passengers ride, they would pay the same $1.50 as an incentive for shared rides.

Service Delivery Description: On Sundays, passengers would request a trip from one of the eligible taxi companies that provide services in the RABA service area to provide a trip from an origin to destination within the existing Paratransit service area. To access a ride, they could either call the taxi company dispatcher or book a trip on a smartphone app. Considerations for a smartphone app are described in detail below.

Institutional Management: SRTA would administer a Request for Qualification process inviting eligible taxi companies to provide a Sunday service in the Redding service area. The RFQ would require the taxi company to demonstrate they have sufficient vehicle capacity to operate a Sunday service operation. With the low fares proposed for the pilot project, a minimum fleet of eight taxis would be needed. The taxi company would also need to show the financial capacity to lease or purchase an accessible taxi vehicle for wheelchair clients that would be a reimbursable expense during the pilot project. The taxi company could utilize the wheelchair accessible vehicle 7 days a week during the pilot project period.

Finally, the taxi company would need to show the technical financial capacity to subscribe to one of the taxi company apps that allow potential customer to request a ride and track the taxi vehicle arrival.

More than one taxi company could become eligible to provide service during the pilot project period, but would be subject to the budget availability of SRTA.

An agreement would be established between SRTA and the taxi companies. If this alternative is selected as the preferred alternative, then the business plan in the next phase of the study would outline the key terms and conditions to include in the agreement.

Smartphone App Considerations

There are multiple taxi apps available for consumers to engage a taxi vehicle, but there is currently only one such app with a national footprint, namely Curb. Curb works similarly to the Uber and Lyft apps in that it is easy to book a trip, confirmation is quick, and all payment is handled automatically. Depending on the local situation, the customer may be able to see the location of the taxi vehicle and watch its progress as it moves towards them. Curb has no fees for customers, but it does collect a commission from the taxi companies who subscribe to it, so not all companies are willing to engage with Curb. It also requires a certain level of technology from participating companies, who must have an automated dispatching system, although it supports many of the older such systems and not just the ones that have become popular during the past several years.

The newer automated dispatching systems, of which iCabi and MT Data Systems are leading examples, have many capabilities that the older systems do not, such as being able to locate vehicles continuously via GPS. One such capability important to public transportation services is that they are able to support shared ride operations on a limited basis, in which trips whose routing and time of occurrence are closely aligned are able to be operated on a "multi-load" basis. That is, both customers could be picked up by the same taxi vehicle and delivered in whatever sequence makes most sense based on the multiple loadings. Different passenger fares can be calculated for such cases as well. In general, these "new generation" dispatching systems have substantial functionality and are more akin to TNC-type platforms than the prior generation of automated taxi dispatching systems.

These capabilities come at a price, however. A platform like iCabi can easily cost a taxi operator six figures depending on the size of their operation and the features that they wish to have available. For small taxi companies, these new generation dispatching systems may be prohibitively expensive to obtain.

In the case of the taxi companies in the Redding area, it is very likely that they could not afford to acquire an iCabi-like system using only their own financial resources. From a practical standpoint the start-up costs for a taxi smartphone app for just a Sunday service far outweigh the potential benefits of having a smartphone app for the the Sunday pilot demonstration program. The high start-up cost likely

make this service delivery option with a smartphone app infeasible, particularly for a Sunday only pilot program.

However, If SRTA did want to purse this option and broaden the scope, for example, to evening service, there may be to way to provide feasible procurement system. It would be possible for the public sector to purchase such a system as part of a procurement of a taxi service provider for the user side subsidy system. While unusual, it would be an appropriate use of public funds as it would make possible a better service than could be achieved without a strong technology platform. In addition, multiple companies can in theory make use of a single iCabi system, so it would even be possible to allow all qualifying companies in the Redding area to use such a dispatch system.

One-Time Start-Up Costs

If a new generation taxi dispatch system were procured, its estimated initial cost—for purchase, installation, and configuration—would be at least $100,000 for an initial license and annual support and maintenance fees would typically represent 20% or more of this amount. Assuming that the purchase price for the dispatch system for a taxi industry the size of Redding's would be $90,000 and that setup and configuration costs would represent an additional 40% of this amount, the initial costs would be approximately $125,000. Annual support costs would be approximately $20,000 and annualized hosting costs would probably be at least $12,000. These costs could be as little as 25% less than these values and as much as 50% more, implying a range of $100,000 to $185,000 for the initial costs and $25,000 to $50,000 for on-going costs annually. These sketch planning estimates are based on industry norms. If a user-side subsidy taxi program is selected as the preferred option with the development of a business plan, the actual costs would be tailored to the needs of Redding.

In addition to these costs, there will be some initial costs for setting up the Curb system in the Redding area, as it must interface with the taxi dispatch system. These costs are assumed to be in the range of $15,000 to $25,000. It is not clear whether there are any on-going costs beyond the commission-based transaction fees that Curb charges the taxi operators whose vehicles can be accessed via the customer app.

A procurement by the public sector on behalf of the local taxi industry would be a novel exercise, and would require the agency responsible for it to work closely with the taxi companies who would use the system. Alternatively, the public agency could engage a consulting firm to organize and execute the entire process, including qualifying the taxi companies, generating the RFP to purchase the taxi dispatch system, and overseeing the implementation process of the technology. Whatever approach is chosen, this will be a significant undertaking and would represent a serious commitment by SRTA to a taxi industry centric approach to providing supplemental capabilities to RABA for public transportation in the region.

Booking A Trip: Sunday passengers would be able to call taxi companies that have signed an agreement with SRTA to provide taxi rides on Sunday. They would also be able to access trips utilizing an available smartphone app as described above. The passenger would be able to input their pick-up location and destination and then hit the Book Trip button. The closest available taxi responds to the request and the smart phone user can watch the taxi as it approaches the passenger's trip origin location. There could be equity issues if more than one taxi company is operating the service. If this option is selected, safeguards will be established in Task J Business Plan.

Service Area: The service area on Sundays would be a trip origin and destination within the boundaries of the current Paratransit service area. A map of this area is shown on the next page.

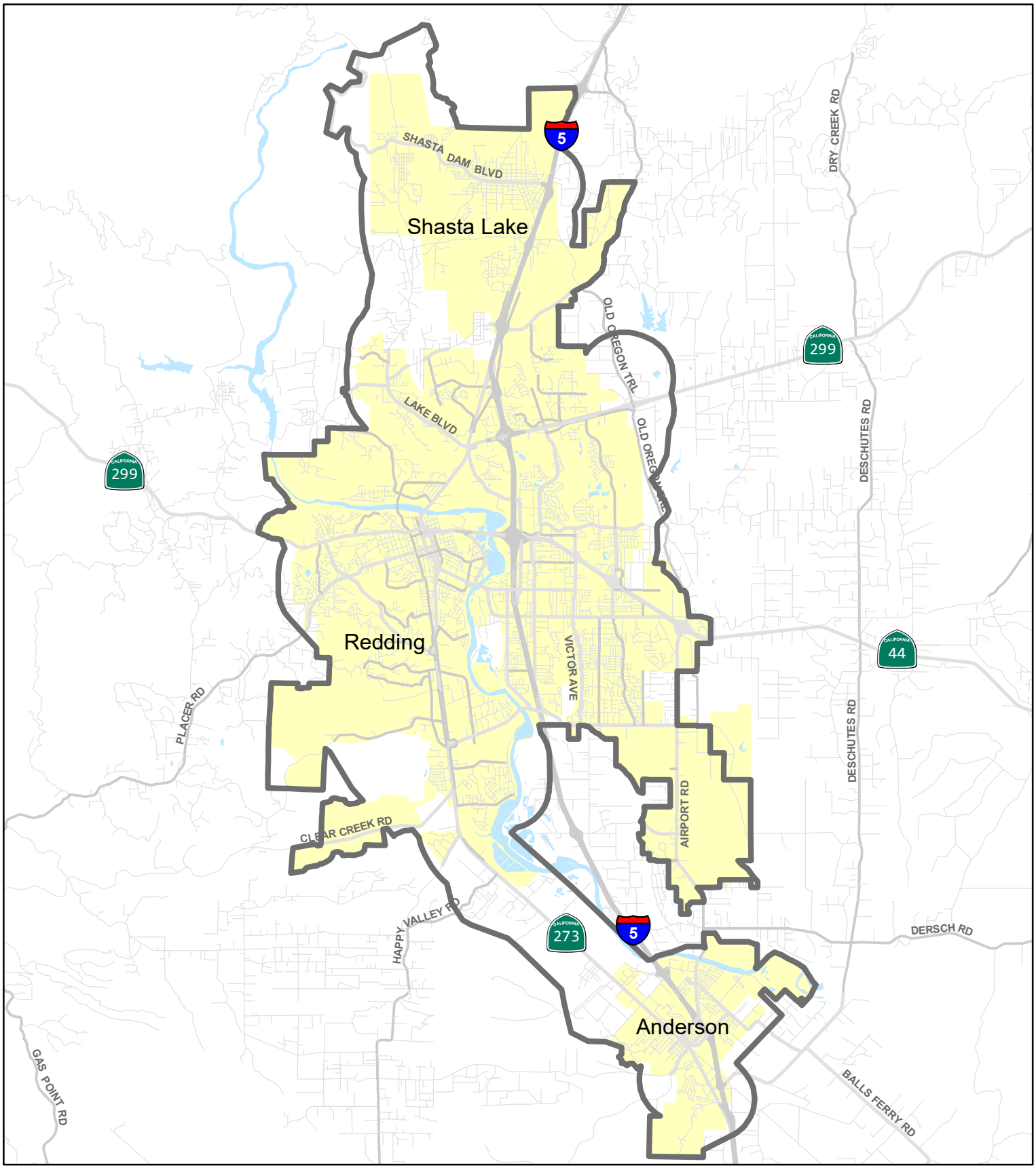
Fares: The taxi company would utilize their meter for all trips on Sunday for a single origin to destination trip. The only difference would be that one of the passengers in the taxi would pay a flat fare of $1.50 per trip for taxi trip up to $20. If the meter fare was more than $20, a passenger would pay the difference. For example, if the metered fare were $25 for the trip, the passenger would pay $6.75 to the taxi driver for the trip. $18.50 for the trip would be invoiced by the taxi company to SRTA.

If a passenger has a RABA Disabled ID Card, ADA Paratransit Card, or is 62 years or older, then the fare would be $0.75. If there are multiple passengers in the taxi, and only one passenger is 62 years or older or has a RABA Disabled ID Card, then the fare would be $1.50.

Span of Service: The Sunday service pilot would operate for 24 hours, from 12:01 am Sunday morning to 11:59 pm Sunday evening.

Accessible Vehicle: None of the taxi companies that were interviewed in the stakeholder interviews currently have an accessible vehicle. In order to participate in the Sunday pilot demonstration program, the taxi company would need to lease or purchase an accessible taxi company during the pilot demonstration program. Accessible minivans that can accommodate a wheelchair can be purchased for between $50,000 and $65,000. The California transit industry association for small urbanized and rural areas, CalACT, has a group vehicle purchasing program through Caltrans. There is an accessible vehicle available in the above price range, depending on the desired features of the vehicle. It may also be possible to procure a used wheelchair accessible vehicle. Since the pilot program may only last a year, leasing a vehicle may be possible but the terms for a one-year lease could be prohibitively expensive. If the user-side subsidy program is the preferred service delivery option, then the actual lease costs and procurement options would be explored in more detail. The lease cost would be a reimbursable expense that would part of the invoice to SRTA during the pilot demonstration program.

Sunday Taxi User-Side Subsidy Option



Service Area Boundary

Source: City of Redding and Shasta County
March 2018

0 1.25 2.5 5
Miles

N

Preliminary Review of Performance Criteria:

- Farebox Recovery: With the low fare structure, for just the direct operating cost, the farebox recovery ratio would expect to be from 5.2% to 8.4% for other direct costs only.
- Total Sunday Service Subsidy Costs: For just the direct operating costs, subsidy cost paid to the taxi companies would be between $179,000 and $312,000.
- Shared Ride Potential: The typical taxi model is a single trip and there would be incentives for shared rides to share the flat fare or percentage costs. Compared to other alternatives, the shared ride potential would be expected to be quite low. The average passengers per taxi ride is estimated to be between 1.7 and 2.3.
- Average Daily Ridership: It is estimated that with the low taxi fares, daily ridership would range from about 300 to 535. This is based on a key assumption that the subsidized taxi program can capture between 25% and 45% of the market potential compared to a fixed route service operating on Sundays. As mentioned previously, there is a great deal of uncertainty on how existing RABA passengers as well as others in the community would respond to subsidized taxi fares. It is quite possible that the low fare structure could generate more demand than available taxi supply during peak demand periods. The high end of the ridership range would likely require more than one taxi company to participate.
- Response to Sunday Service Needs: Based on the onboard survey results, the use of taxis was not a popular option for Sunday service. However, if reliable service were provided at an affordable price, the user-side subsidy program has the potential of meeting Sunday needs at a reasonable cost.
- Vehicle Miles Traveled: At an average of 4 miles per trip, with a taxi occupancy of between 1.7 and 2.3 passenger per trip, the preliminary estimate of vehicle miles travelled would be between 35,640 and 47,400 vehicle miles travelled.
- ADA Accessibility: Obtaining a wheelchair accessible vehicle would be a requirement for becoming an eligible taxi provider for the Sunday service pilot project. With a one-year pilot demonstration program for Sunday service, procurement of a used vehicle or leasing a vehicle would likely be the most viable option. None of the existing taxi companies currently have a wheelchair accessible minivan.
- Coverage Impacts: The coverage area will be the same as the existing ADA Paratransit Service area, so there are no negative impacts in this option.
- Relative Travel Time: For six sample origin and destination pairs, taxi service total travel time, including waiting and trip time, would be 27 minutes less than the average fixed route bus trip for six comparison trips tested in the RABA service area. For the sample trip between Loma Vista Apartments [3980 Churn Creek Rd. Redding] to In-N-Out Burger [1275 Dana Dr. Redding], there would be a 10 minute wait once the taxi was requested on the app or a call was made, and it would take eight minutes to ride the taxi for a total trip time 18 minutes.

Summary of Primary Benefits

Having a user-side subsidy taxi program at the same price as RABA fixed route service would be extremely beneficial in providing mobility to individuals who rely on RABA services. It will be significantly less expensive than Paratransit service, and senior and disabled individuals are likely to utilize the direct convenience of a taxi service for shopping, place of workshop and work trips. The directness of travel of taxi trips compared to RABA fixed route would be very convenient to most passengers. Overall, such a Sunday service provided by taxis would provide an excellent mobility choice for individuals without a car or drivers license.

Sunday service provided by one or more local taxi companies would be an economic development benefit to the local economy. Taxi companies report low utilization of taxis on Sundays for regular fares. The deep discounted fares for the subsidized taxi program would likely keep the qualified taxi fleet very busy on Sundays, providing excellent business for the local taxi companies owners and drivers. In the era of Uber and Lyft, this would provide a needed economic "shot in the arm" to local taxi companies who have seen business decline with the advent of ridehailing companies.

Summary of Strengths and Weaknesses:

Strengths:

- Very affordable transportation on Sundays for RABA fixed route, Paratransit and other community members.
- Directness of travel and travel time saving compared to traditional fixed route RABA service.
- Trip subsidies provided for actual trips taken and the net cost of the trip. The use of taxis in low demand periods like Sundays is generally more cost effective than providing dedicated vehicles. However, the low fares offered in all options does negate this typical advantage.
- Strongly support the local taxi industry. Two taxi companies interviewed for this project were potentially interested in partnering with SRTA to provide Sunday service.

Weaknesses:

- Existing taxi companies lack accessible vehicles for wheelchairs. The cost of providing an accessible taxi for a year long pilot program for Sundays only is very expensive.
- The start-up costs for providing an "on-demand" smartphone app is very high, likely making this feature infeasible.
- The complexities of providing both general public ($1.50) and senior/disabled ($0.75) fares with taxi drivers. Without direct supervision, there are opportunities for drivers to not collect the appropriate fares.
- The very low fares could generate more demand than available taxi supply.
- The low shared-ride potential would not achieve regional goals relative to congestion and greenhouse gas reduction.

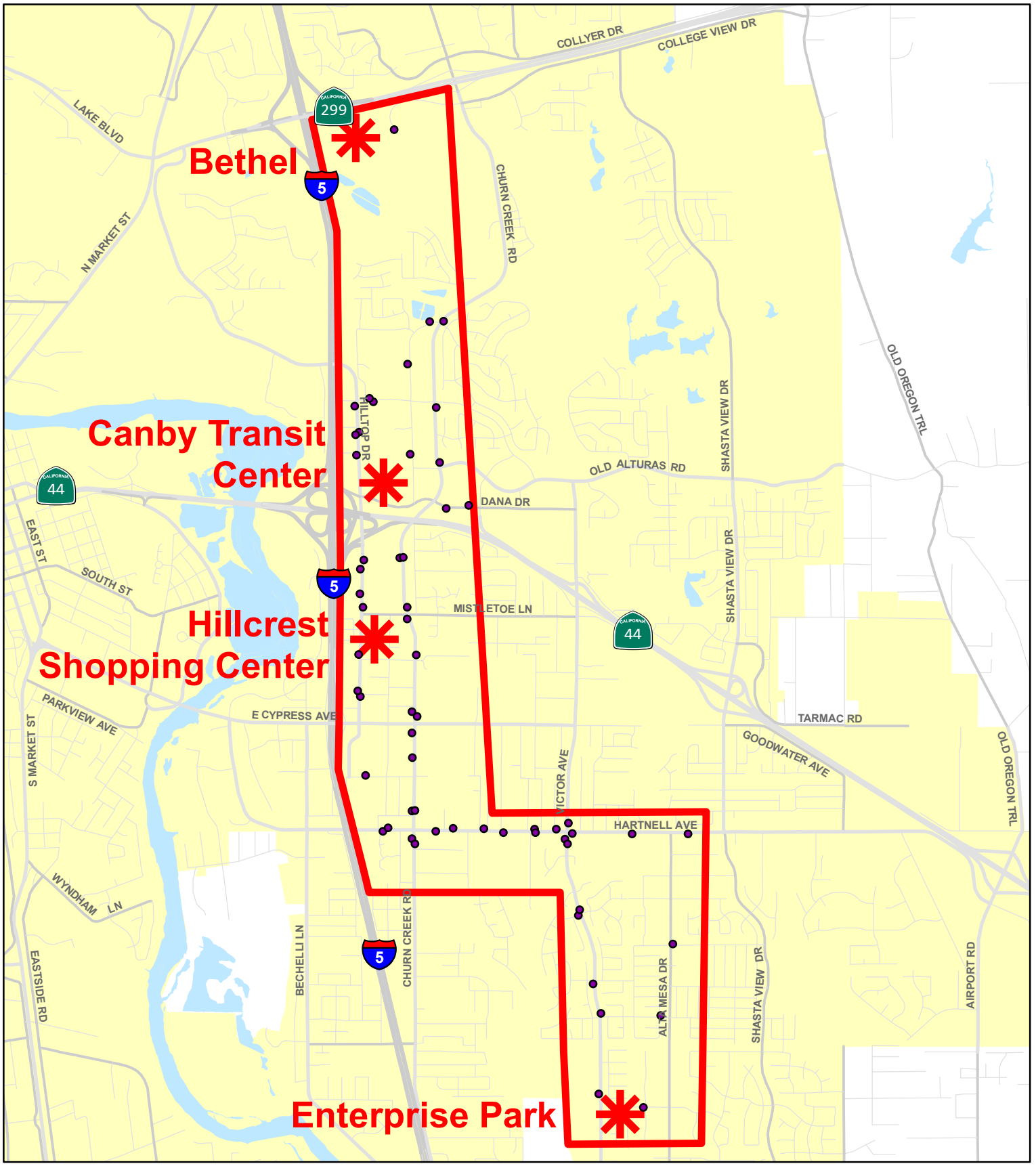
Option #4 Micro-Transit

Description of Service Option: "Micro-transit" is a term without an accepted and common meaning that has recently come into use. In general, it refers to transit services delivered in small vehicles—mini-bus size or smaller—in which the service itself has some type of demand responsive or flexible element. Most importantly, the route of each vehicle is determined at least in part by explicit requests for service. Those requests may be of a somewhat fixed nature, such as a person who is making a work trip each day, or they may be completely dynamic, such as a person wanting to make a trip from their home to the grocery store 15 minutes from now. In the former case, the service would have the character of a vanpool or buspool, in which specific locations are served but the vehicle may not stop at intermediate locations enroute to its final destination; in the latter case, the service has more of the characteristics of a general public Dial-a-Ride (DRT) or is commonly called a Flex service. The services operated by Bridj in the Boston area (now terminated) and Chariots in San Francisco are among the most widely publicized micro-transit services.

Micro-transit service is perhaps best viewed as a hybrid type service combining fixed, flex, and demand responsive elements. As envisioned for the SRTA Sunday pilot demonstration project, each micro-transit "route" would operate on a cyclic basis, leaving from and returning to the same location, in most cases the Downtown Transit Center. Each vehicle cycle will have a small number of scheduled bus stops—most likely 3 to 5—that the vehicle will visit on a time window schedule, with the time windows being no more than 5 minutes. These scheduled bus stops form the backbone of the service. In addition, passengers may request service at other locations—typically other RABA bus stops – via a web and/or smartphone application. These other locations— referred to as "checkpoint stops"—will be dynamically generated by the technology used to manage the micro-transit service. The map on the next page shows a sample of what a micro-transit route in Redding might look like. The four scheduled stops would have a regular schedule on Sundays that would operate on a timetable. Passengers would be able to utilize a smartphone app or make a phone call request to the dispatch center to request a ride at any of the checkpoint stops to another checkpoint stop or a scheduled stop location.

SRTA in collaboration with RABA may choose to restrict the unscheduled checkpoints to be existing RABA bus stops as shown in the sample below or they could be dynamically generated street intersection locations. However, the vehicles will not pick up and drop-off passengers at individual addresses unless they are ADA certified. In addition, a passenger whose pickup location is served by one "route", but whose drop-off location is in a completely different part of the RABA service zone, will need to transfer to another micro-transit vehicle at the Downtown Transit Center (or one of the other transfer locations) to complete their trip. This is not different from current RABA fixed route service.

Sample Micro-Transit Route



Checkpoint Stops Within Micro-Transit Route Service Area

Scheduled Stops

Micro-Transit Service Area

Basemap Source: City of Redding and Shasta County
March 2018

0 0.5 1 2 Miles

N

The service provider selected for this scenario would have the option of allowing passengers who appear at the "scheduled bus stops" not to have to make a booking for their trip, but to simply tell the driver their destination unless it is another scheduled stop. This will only work if the technology platform used for the micro-transit service has the capabilities to support these "spontaneous" boarding trips by being able to dynamically schedule them at point of passenger boarding. There are technology systems with these capabilities.

With the low fares, it is likely that the micro-transit service described here would require the operation of complementary paratransit services. Micro-transit service would provide the same accessibility to passengers with disabilities as a general public DRT service. However, with the low fares, it is expected than many disabled individuals would request rides, and supplemental vehicles would be needed to handle the demand in order for the micro-transit bus to maintain on-time performance at the scheduled stops. It could also provide door-to-door services for ADA eligible customers upon request. Two additional vehicles are assumed to be needed to handle checkpoint to checkpoint stops requested that cannot be handled by the micro-transit vehicle serving the scheduled stops. The extra vehicles would be able to provide supplemental service as priority for ADA Paratransit passengers, but would also provide extra capacity to handle extra checkpoint stops that cannot be handled by the micro-transit bus that needs to make scheduled stop time.

Institutional Management: Management and operation of this demand responsive service would be selected through a competitive procurement process carried out under the authority of the Shasta Regional Transportation Agency. A competitive procurement of this type will need to be initiated at least 6 months prior to the intended start-of-service date, with development of the procurement and scope of work documents preceding that. Timing of this procurement depends on many factors, including responsibility for providing the necessary vehicles and equipment, facilities, communications and technology, and, not the least, that this will be a brand new service without on-going public information, employees, and service structure.

Potential proposing firms and organizations might include regional and local transit management companies, local charter and for-hire bus operators, and nonprofit organizations with existing transportation capabilities. From a business standpoint, however, interest in this project will be limited by the fact that the service will operate only a single day each week. If the successful contractor is also required to provide the necessary accessible transit vehicles, this likely will limit the number of prospective management firms further.

Once a management firm is selected, the Shasta Regional Transportation Agency will assume a continuing project management role throughout the life of the pilot project. This management role includes monitoring of service delivery; receipt, review and payment of invoices; service planning; public information/marketing; and provision of any service infrastructure such as bus stops. This management

function will require some dedicated headcount or staff resources. If micro-transit is selected as the preferred option, then the details of the administrative costs would be developed.

Smartphone App Considerations: The selection of a technology platform for the micro-transit pilot program is almost as important as the procurement of the service operator. The technology system for such a service is as fundamental to its successful deployment as for any DRT service like ADA paratransit. The technology platform needs to be able to schedule the vehicles to meet the service demands while also adhering to the quasi-route like structure of the service. This is different than conventional DRT services and requires a technology system that can be tailored to achieve the objectives of the service plan that will be developed by SRTA. In addition, the technology platform will need to include a customer facing application—with both a smartphone app and web-based access to trip booking capabilities—that will enable customers to engage the service and track vehicles as they approach their pickup location. Fare payment may also need to be accomplished via the app or web-based application.

It is our recommendation that the technology platform for the micro-transit pilot program be procured separately from the service operator. It is possible to require the service operations proposers to also include the technology system as part of their bid submissions, but this opens the possibility that an attractive operations proposal might be combined with a less preferred technology platform. It is possible to also undertake the procurements simultaneously and allow technology vendors and operations providers to make either separate or combined submissions, with appropriate break out of operations and technology costs, thus enabling SRTA to decide what the best approach is. If the superior operations management proposal is not paired with the superior technology proposal, it is likely that the operations entity can also use the preferred technology platform. This is standard practice in ADA paratransit services (i.e., the service contractor is able to use different technology systems in different transit agency implementations).

Service Area: The proposed service area for the micro-transit pilot program is the current RABA Service Zone 2, which covers the core RABA service area and would accommodate the primary trip origins and destinations identified on the outreach survey. It is proposed that four micro-transit "routes" be established, with some overlapping coverage of these routes. The nominal length of these routes would be 12 to 17 miles, depending on what operating speeds were deemed appropriate for Sunday service when traffic is reduced from normal conditions, and the routes would be configured in such a way that the entire length would only be driven if there were demand for the service in the different route segments. This is because aside from the scheduled stops the vehicle would deviate its route based on actual demand. All routes could begin and end at the Downtown Transit Center, although one or more routes could also be focused on the Canby (as the example provided above did) and/or Masonic transfer centers. It may be desirable to have routes that include 2 of the RABA transfer/transit centers. The nominal cycle of the vehicle would be 60 minutes, although if demand patterns warrant, it might be feasible for two vehicles to operate on 30 or 45 minute cycles.

The demand response service component would serve a "service envelope" extending three-quarters of a mile (3/4) to either side of the direct-line routes between designated scheduled bus stops. Initially, the demand response service would be limited to no more than 2 door-to-door pick-ups or drop-offs between designated scheduled stops to ensure on-time arrivals at those checkpoints. Based on experience during the pilot phase, the number of deviations would be adjusted to ensure on-time service for both checkpoint and demand response services.

Fares: Micro-transit would charge a flat fare of $1.50 and $0.75 for seniors and disabled individuals boarding at both scheduled stops and checkpoint stops. These same fares would apply to deviation trips made by ADA paratransit eligible individuals.

Span of Service: Micro-transit service would be provided during the hours when the community has expressed desire for fixed route-style transportation for church, shopping and recreation trips. This would be essentially from 6:30 AM to 7:15 PM. The amount of service to be provided could vary during the day. A baseline service with six vehicles is being proposed. An additional two vehicles would not be on the micro-transit routes with scheduled stop, but would provide supplemental service to ensure on-time performance of the micro-transit and to serve ADA Paratransit trips as needed.

Accessibility: Micro-transit service would need to be operated with ADA accessible vehicles to ensure their accessibility by all riders. The required accessible vehicles could either be provided by a contract operator or by the sponsoring public agencies. Since these vehicles would only be needed one day each week for this service, it is important that existing vehicles be identified rather than proposing the acquisition of dedicated vehicles, which would be cost-prohibitive.

The Micro-transit service will not necessarily follow existing bus routes, but can be designed so that it only picks up or drops off ADA eligible passengers at existing RABA bus stops or, by advance reservation, at other specific origin/destination locations. This will ensure the accessibility of the scheduled bus stops and designated checkpoint stops since RABA bus stops are mostly up to ADA standards for boarding and deboarding of wheelchairs and other mobility devices. However, it may be much more convenient for ADA eligible passengers to be picked up at non-bus stop locations, provided that they are on streets with paved sidewalks and curb cuts. This can only be determined by a more in-depth assessment after candidate micro-transit routes are designed.

Potential partnership opportunities: As mentioned with other service options, partnerships with key churches and other activity centers are a possibility to offset the difference between the weekday and expected Sunday farebox recovery. Such partnerships could be arranged as standing order pick-ups and drop-offs at a place of worship so as to coincide with Sunday service times. Such an arrangement might require a guaranteed minimum trip count and farebox revenue to ensure that fare recovery ratios are achieved.

Market Research Input: Micro-transit service is essentially a hybrid between fixed route and demand responsive service, with the former operating in a checkpoint service modality. By offering fixed stop service similar to regular RABA service, micro-transit service would at least partially respond to the expressed preference of 78% of the onboard survey respondents to have a fixed route service with the same fares as on existing RABA fixed route service, although micro-transit service will not cover all of the existing RABA fixed routes.

Start-up and Software Cost

Estimated technology platform costs are between $30,000 and $40,000 for planning, configuration, training etc. prior to service launch. The software as a service licensing fees could range between $36,000 and $60,000 per year, with the best estimate being $48,000. These are modestly higher than the general public demand response with an app costs as this is a more complicated service configuration.

Preliminary Review of Performance Criteria:

- Farebox Recovery: Micro-transit service operating in the core RABA service area for the entire day on Sunday is projected to have an annual Sunday ridership of about 530 , ranging from 360 daily trips as the low estimate to a high of 680 with a preliminary farebox recovery ratio of 8.6%, again ranging from 6.0% to 10.1%. This wide variation in prospective ridership is due to the unpredictability of Sunday transit service in an area that has never had such service as well as the innovative nature of the micro-transit service that is being proposed.
- Total Sunday Service Subsidy Costs: A micro-transit service would have an annual direct operating cost of approximately $345,000 and, based on the projected farebox recovery above, a Total Subsidy Cost – or net cost – of $315,000 to $337,000. This includes 6 vehicles in regular micro-transit service and two supplemental vehicles to accommodate additional ADA Paratransit ride requests.
- Shared Ride Potential: This service option has a high opportunity for realizing shared riding due to the operation of fixed stop service in conjunction with on-demand trips between scheduled stops. Based on the experience of micro-transit Service elsewhere, the preliminary projection for this option is an estimated combined productivity of 3.6 to 6.0 passengers per vehicle revenue hour.
- Average Daily Ridership: Based on the mean projected average hourly productivity of 5.1 passengers per vehicle revenue hour on the micro-transit Service, this service option is projected to transport about 530 trips on an average Sunday, ranging from a low estimate of 360 per day to a high estimate of 680.
- Response to Sunday Service Needs: This service option accommodates most of the transportation needs expressed in the onboard survey and stakeholder interviews, including:

preference for fixed route service, need for early morning and evening work trips, and provision of service to Downtown Redding, Hilltop Drive and Mt. Shasta Mall.

- Vehicle Miles Traveled: Based on an average operating speed on the micro-transit service of 18 miles per hour, which is faster than RABA's reported operating speed in FY2018 but appropriate for a service of this type with fewer stops and less passenger loading and unloading time, this service option is estimated to result in a total vehicle miles traveled of approximately 95,000.
- ADA Accessibility: The proposed micro-transit service will be fully accessible and through both the six micro-transit buses and the two supplemental Paratransit vehicles. The Paratransit vehicles will provide door-to-door advance reservation transportation for ADA paratransit eligible individuals who cannot access the designated checkpoint stops.
- Coverage Impacts: During the micro-transit pilot, service will only be available in RABA Zone 2. Based on ridership during the pilot, micro-transit service could be expanded outside Zone 2.
- Relative Travel Time: Since the network of approximately four micro-transit routes have not been developed, it is not possible at this time to calculate the relative travel time. However, here is how the sample trip from the Loma Vista apartments to the In-N-Out-Burger might work. This travel time example assumes that both stops are not scheduled stops. A person books a trip on the app and is directed to the RABA bus stop immediately adjacent to the apartment complex. She is told the bus will arrive to the stop in 12 mnutes. To be safe, she walks the two minutes to the bus stop and arrives 5 minutes before the bus arrives. After being picked up, the bus goes out of direction for three minutes to pick up another passenger and then goes to a scheduled stop, but arrive two minutes before the bus is scheduled to depart and the bus driver waits, and picks up two additional passengers. The bus then picks up two additional passengers along the route at unscheduled stops, going out of direction for six additional minutes. The bus then drops off the passenger at the In-N-Out burger. The total time from booking the trip is approximately 31 minutes.

Factors Behind Variance in Performance Estimates

There is a large amount of uncertainty on the ridership demand for the micro-transit service described above. The low fares will make the service attractive to potential Sunday riders. The scheduled stops will allow many passengers to utilize the service without a reservation. If outreach efforts are successful with places of worship to have regular subscription group trips, this will increase service demand and productivity. These are driving forces that will tend to increase the passengers per vehicle revenue hour.

Many passengers will need to make reservations for the service. Many general public RABA riders are not familiar with making advanced reservations. Those potential passengers with smartphone will likely request rides utilizing the smartphone app in real time, but the relatively low density of demand in real time will be a restraining force on productivity. Regular riders on RABA are a primary market for Sunday service. They have a different schedule on Saturdays than weekdays. On Sundays they are being asked in this service option to make a choice between scheduled and checkpoint stops pick-up and drop-off

locations. The wait times are likely to be longer than knowing a fixed route bus will show up at the bus stops. The fact that at the same bus stop, different hours and types service will be offered on weekdays, Saturdays and Sundays will also very likely be confusing to some passengers and would likely be a significant restraining force on demand.

Summary of Primary Benefits

- Provides fixed route-like transit service in core RABA service area at passenger fares identical to existing RABA service.
- At low-to-moderate demand for door-to-door service this option would be fully-accessible and would meet ADA requirements without a separate ADA paratransit service.
- Service can be structured to accommodate a service App while also allowing individuals not using smart phones to access the transit services.

Summary of Strengths and Weaknesses

Strengths:

- Will provide a fixed route-like transit service that will be familiar to current RABA riders and meets their indicated service preference.
- Micro-transit service can accommodate low-to-moderate door-to-door trip demand by ADA eligible riders without requiring a separate ADA paratransit service.
- Productivity and shared-riding are potentially high due to the fixed route back-bone element of this service.

Weaknesses:

- The checkpoint service concept is similar to RABA fixed route service but may be confusing to some riders since only selected existing bus stops would be served and would require a phone or app-based service request.
- Pilot would not provide Sunday transportation within RABA Zone 1 and 3.
- Demand response capacity is limited between scheduled stops to ensure on-time performance. With low fares, it is quite possible that additional vehicles will be needed to ensure on-time services are operated.
- Moderate-to-high demand for door-to-door trips by ADA eligible individuals may require implementation of a separate ADA paratransit service, which would incur increased costs.

4. Conclusions and Recommendation

This section of the working paper first provides a comparison of the four Sunday service delivery options for the Redding area. Second, summary observations and conclusions from the sketch planning process are provided. Finally, a recommendation is provided for proceeding to Task J, Development of the Business Plan.

Service Option Comparison

The table on the next page provides a comparison of the following variables for each of the four Sunday service delivery options:

- Sunday service span
- Service Supply
- Direct Operating Cost per Vehicle Revenue Hour
- Estimated Annual Passengers
- Passenger Per Vehicle Revenue Hour
- Fare Revenue
- Farebox Recovery Ratio for Direct Operating Costs
- Assumed Administrative Costs
- Annual Software Cost
- Farebox Ratio for Total Operating and Administrative Costs
- One-Time Start-Up Costs

There are several key assumptions in the comparison table. The first is that the cost of directly operating the service is $65.00 per revenue service hour for the fixed route baseline, micro-transit and demand response with app options. The direct operating costs include the driver wages, benefits, fuel, and maintenance related costs. For sketch planning purposes, this provides a consistent basis for comparison. Assumed administrative costs are 15% of direct operating costs, an industry norm for administrative costs. The annual software licensing fees is in the middle range of anticipated costs. Capital costs are not included in comparison of Sunday service options, with the assumption existing fleets would be utilized. The exception is the user-side taxi subsidy option that would require the purchase or lease of a wheelchair accessible vehicle. Overall, sketch planning is meant to provide consistent order of magnitude cost to help with narrowing the alternatives to a preferred alternative for more detailed analysis and cost estimation.

Comparison of Sunday Service Options

	Fixed Route Baseline	User-Side Taxi Subsidy	Micro-Transit	Demand Response w/app
Sunday Service Span				
Start	9:20 AM	12:01 AM	6:30 AM	6:30 AM
End	7:15 PM	11:59 PM	7:15 PM	7:15 PM
Service Supply				
Vehicles in Peak Service	15	8	8	7
Vehicle Revenue Hours (VRH)	7,140	N/A	5,304	3,863
Direct Operating Cost/VRH	$ 65.00	N/A	$65.00	$65.00
Direct Operating Costs (DRC)				
Low	$ 447,525	$ 189,338	$ 334,815	$ 251,111
Medium	$ 464,100	$ 265,073	$ 344,760	$ 265,200
High	$ 480,675	$ 340,808	$ 374,595	$ 281,775
Estimated Annual Passengers (51 Sundays)				
Low	55,754	15,147	18,434	12,169
Medium	64,346	21,206	27,117	17,136
High	73,093	27,265	34,744	22,759
Passengers Per Veh. Revenue Hr. (systemwide)				
Low	8.10	N/A	3.6	3.2
Medium	9.01	N/A	5.1	4.2
High	9.88	N/A	6.0	5.3
Fares and Fare Revenue (FR)	$1.50/0.75	$1.50/0.75	$1.50/0.75	$1.50/0.75
Low	$ 68,773	$ 9,846	$ 20,093	$ 13,690
Medium	$ 81,076	$ 18,025	$ 29,557	$ 19,278
High	$ 93,998	$ 28,628	$ 37,871	$ 25,604
Farebox Recovery Ratio for Direct Operating Costs (FR/DRC)				
Low	15.4%	5.2%	6.0%	5.5%
Medium	17.5%	6.8%	8.6%	7.7%
High	19.6%	8.4%	10.1%	10.2%
Assumed Administrative Costs (AC)	$69,615	$39,761	$51,714	$39,780
Annual Software Costs (SC)	$0	$32,000	$48,000	$36,000
Farebox Recovery Ratio Total Costs (FR/(DRC+AC+SC)				
Low	13.3%	3.8%	4.6%	4.2%
Medium	15.2%	5.4%	6.6%	5.7%
High	17.1%	6.9%	8.0%	7.2%
One-Time Start-Up Costs		$125,000	$40,000	$25,000

Funding Options

There are many different funding sources for transit projects available through federal and state sources. Most funding program focus on providing funds for capital resources or training with very few providing operating assistance funding. Below is a list of possible short-term and long-term funding sources for a Sunday service:

Program	Description	State, Federal or Local	Operating or Capital?	Competitive or Formula?
Low Carbon Transit Operations Program (LCTOP)	Provides operating and capital assistance to transit agencies to reduce greenhouse gas emissions and improve mobility. Funds support new or expanded projects if they reduce GHG emissions.	State	Both	Formula
Transportation Development Act (TDA)	Provides two sources of funding: Local Transportation Fund (LTF) and Spillover State Transit Assistance (STA). STA funds can only be used for transit.	State	Both	Formula
State of Good Repair (SB 1)	Funds capital projects that maintain transit vehicles or facilities in a state of good repair.	State	Capital	Formula
FTA Section 5310	Provides funding for capital, mobility management and operating expenses for transit that serves elderly and persons with disabilities.	Federal	Both	Competitive
FTA Section 5307	Provides funding for transit in urbanized areas.	Federal	Both	Formula
FTA Section 5339	Provides capital funding for buses and bus facilities.	Federal	Capital	Formula
FTA Section 5311	Provides funding for transit services in rural areas (population areas with less than 50,000 people)	Federal	Both	Formula
FTA Low or No Emission Program 5339(c)	Provides funding for purchase or lease of low/no emission vehicles and supporting equipment, or to improve facilities in support of low/no emissions vehicles and equipment.	Federal	Capital	Competitive

Summary Conclusions

Fixed Route Baseline Option

The baseline fixed route service option would operate the same service as RABA currently operates. In the onboard survey RABA passengers overwhelming chose fixed route transit as the preferred service delivery mode with almost 78% of respondent choosing fixed route transit. A major contributing factor was that the fixed route option was also the least inexpensive with a $1.50 fare for the general public and $0.75 for seniors and disabled individuals. In discussing the survey results with SRTA management, it was decided that for the sketch planning process the fares would be kept constant for all service delivery options. It is acknowledged in the sketch planning analysis in Chapter 3 that there is significant uncertainty on how existing RABA riders and other potential riders would respond to very low fares for a taxi trip or on a demand response service.

Fixed route service is very familiar to the existing RABA ridership base. Saturday service is provided throughout the RABA service area. The analysis indicates that Sunday service would likely have from 70% to 90% of the productivity and ridership of Saturday service, keeping all variables the same including the span of service. Since the onboard survey found that worship services and many work start times begin prior to the current start time of Saturday service, the ridership and performance of Sunday service could fall at the lower end of expected ridership. The Sunday travel patterns are likely to be significantly different than those on Saturday or weekdays.

Despite the potential shortcomings of replicating Saturday service for Sunday service, the baseline fixed route service is expected to have the most ridership, the highest productivity, and overall highest farebox recovery ratio of all alternatives. However, it is also the most expensive service delivery option, with $464,100 of directly operated expenses and almost $70,000 in assumed administrative costs.

The fixed route option is a baseline option. The purpose of the Sunday "On-Demand" Feasibility Analysis is to evaluate and recommend a less expensive and customer friendly Sunday service delivery option.

User-Side Taxi Subsidy Option

Using available taxis in the greater Redding area would have a number of advantages. Sunday service travel patterns are expected to be quite dispersed, with lower demand than the typical weekday or Saturday. The taxi industry has been hard hit by the advent of Uber and Lyft services. Utilizing taxis for the Sunday service demonstration pilot would potentially provide convenient service for the passenger and provide an economic boost to the taxi industry in Redding. Relative travel times are the best with taxi services. With the typical taxi ride from origin to destination being $1.50 for the first $20 of the taxi meter, there would be a built-in incentive to share rides. However, the degree of shared rides is unknown and the average trip could be between 1.7 and 2.3 passengers per trip.

There are two major constraints for taxis to be the preferred alternative. The first is that taxi companies in Redding do not have an accessible vehicle for wheelchair trips. The cost of leasing or purchasing even used wheelchair accessible vehicle would be very expensive for operating 51 days during the pilot one-year demonstration project.

The second major constraint is that there is a desire of SRTA to be able to book a trip utilizing a smartphone App. This is being implemented in larger metropolitan areas. In order to have a smartphone App like Curb, the taxi company needs automated dispatching software, and the taxi companies in the Redding area do not have such software. The start-up costs of $125,000 for such software is extremely high for a year-long demonstration project for one day a week service.

Micro-Transit Option

As previously discussed, micro-transit does not have a commonly agreed upon definition. For the purposes of sketch planning, the micro-transit option discussed for Sunday service would be a hybrid between fixed route service and demand response service. On each micro-transit route, there would be three to five scheduled stops and the bus would serve those stops on a regular schedule similar to fixed route. However, other stops would only be served on an on-demand basis, with either an advanced reservation or calling or using a smartphone app to request a ride to a destination within the micro-transit service area or transfer to another micro-transit route at a transfer destination to their final destination. This type of micro-transit service with both scheduled and checkpoint stops is operating very successfully around the Newark and Castro Valley BART stations in the San Francisco Bay Area. However, the micro-transit service, branded AC Transit Flex, operates Monday to Friday.

The micro-transit option would have the most shared rides, productivity and overall ridership of the three on-demand options. It has the potential of having the highest farebox recovery ratio compared to the other two on-demand options.

The biggest constraint to implementation of micro-transit in the Redding area would be passenger complexity. Currently, regular RABA riders have one schedule on weekdays, and a shortened schedule on Saturdays. Overlaying a completely new micro-transit service for just Sunday service would be extremely confusing to passengers.

General Public Demand Response with App

Introduction of general public demand response service with a smartphone app for Sunday service would be very easy for RABA passengers and other potential riders to understand and utilize. The addition of a smartphone app to access and use the service would help to improve overall productivity, although the jury is still out on how much. The pilot demonstration area is proposed to be limited to the RABA's Zone 2 which is essentially the Redding core area. This would enable origin to destination trips to be limited in length without the need to transfer. However, if the demonstration project is successful,

the service is easily expandable and the demand patterns during the demonstration project could be utilized to formulate a plan to include the City of Shasta Lake and Anderson in a second phase of the project. As discussed previously, the passenger demand for a general public Dial-a-Ride service on Sundays, for a fare of $1.50 for the general public and $0.75 for seniors/disabled individuals, is very uncertain, but we would expect the demand to be towards the high end of the estimates. However, this option has the ease of easily changing parameters to increase fares to dampen demand if passenger volumes exceed available supply. The $1.50 base fare could be branded as an introductory offer, so that passengers know from the start that fare levels could increase.

The main constraints to this service delivery option are 1) the need for drivers to have GPPV certification and training; and 2) fleet size of potential vendors for the service. However, the consulting team does feel that these constraints can be overcome.

Recommendation

It is recommended that the demand response service with a smartphone app proceed to the development of a Business Plan in Task J. The recommended business plan for the Sunday Service Demonstration Project will provide the necessary details to implement a demonstration program. This will include:

Service plan elements: The service plan elements will depend on the preferred alternative selected. The description of the service elements that were developed in this working paper will be brought forward in the business plan and fleshed out.

Institutional Management Element: This element will define how the Sunday On-Demand Demonstration will be managed. Specific recommended roles and responsibilities will be defined.

Contracting provisions and elements for a RFP process: Based on the selected service model, the consultants will assist SRTA in developing the transit service provider requirements in a "scope of work" format that can be readily used to support a competitive request for proposals If SRTA determines a RFP process is necessary. Guidance will be provided on the key elements of a contract for service delivery. Included within these requirements will be any specific monitoring and reporting associated with prospective funding sources as well as any contracting requirement related to federal, state or regional funding sources.

Potential Phasing and Expansion: While the Sunday Demonstration project in the recommended service area is a good place to start, the Business Plan should also look at the feasibility of phasing the service throughout the RABA service area on Sundays.

Costs and revenues: A detailed budget will be developed for the recommended service plan over a two-year period. The projected costs for Sunday On-Demand Transit Service will include direct operating costs, administrative costs, start-up costs and ongoing software fees. While LCTOP funds are the recommended funding source, the business plan will determine if supplemental revenues will be needed to support the demonstration project. In consultation with SRTA staff, the Business plan will evaluate the revenue source that could be utilized for the second year of operation.

Branding and Marketing: A marketing/branding workshop will be conducted during the site visit for the second round of community workshops. The marketing/branding workshop will provide the foundation for the development of a name and slogan for the Sunday service, as well as be an opportunity to discuss potential marketing strategies.

A name and slogan for the Sunday service will be recommended and logo alternatives drafted. The logos will be presented to the stakeholder group via web conference, allowing an opportunity for in depth discussion. With input from the group, the preferred alternative will be refined, circulated for review and finalized.

A comprehensive set of marketing recommendations for the launch and on-going promotion of the new general public demand response service with an app will be developed. The recommendations will include specific materials to be developed for use in implementing the recommendations which will address passenger information, partnering with social service agencies and businesses, public relations and other cost-effective approaches.

With input from the client and key stakeholders, a budget and schedule for implementation of the marketing plan will be developed.