ALAMO AREA

Bike Share Master Plan

Shared Mobility in Bexar County

Draft Report
November 26, 2018

Prepared by:

TOOLE DESIGN HALFF

Table of Contents

Acknowledgements

Study Oversight Committee

Jeanne Geiger, AAMPO, Project Manager
Linda Alvarado-Vela, AAMPO
Allie Blazodky, AAMPO
Yida Capriccioso, City of New Braunfels
Jillian Harris, City of San Antonio
Riley Metcalfe, City of Boerne
Crystal Miranda, City of Seguin Parks and Recreation
Tim Mulry, VIA Transit
Susanna Ramos, City of Boerne
Jason Rodriguez, VIA Transit
Darcy Schipull, Texas Department of Transportation
Tiffany Simper, Bexar County Public Works
JD Simpson, San Antonio Bike Share
Angel Whitley, San Antonio Bike Share
Deborah Wilson, City of Boerne

Authors

Toole Design Group

RJ Eldridge, Principal
Adrian Witte, P.E., Senior Engineer
Rae-Leigh Stark, AICP, Project Planner
Erin Machell, Planner II
Belinda Judelman, Planner

Halff Associates, Inc.

Jim Carillo, Vice President
Christian Lentz, AICP, Senior Planner
Jill Baumgartner, Landscape Architect

1. Introduction

The Alamo Area Metropolitan Planning Organization (AAMPO) is evaluating the role of bike share and other forms of shared mobility in the Greater San Antonio Region including expansion or changes to the existing bike share program in San Antonio (Bexar County), planning for new shared mobility options such as electric-assist (e-assist) bikes and electric-powered scooters (e-scooters), and considering shared mobility options suitable for smaller communities in Guadalupe, Comal, and Kendall Counties.

This report focuses on Bexar County and presents a background and history of the existing bike share program, explores the City of San Antonio's new dockless pilot program, and presents the results of an independent analysis that looked at demand, equity, public and stakeholder opinion, and experience from other cities to develop options and recommendations for how San Antonio should move forward and best leverage public and private investment in shared mobility.

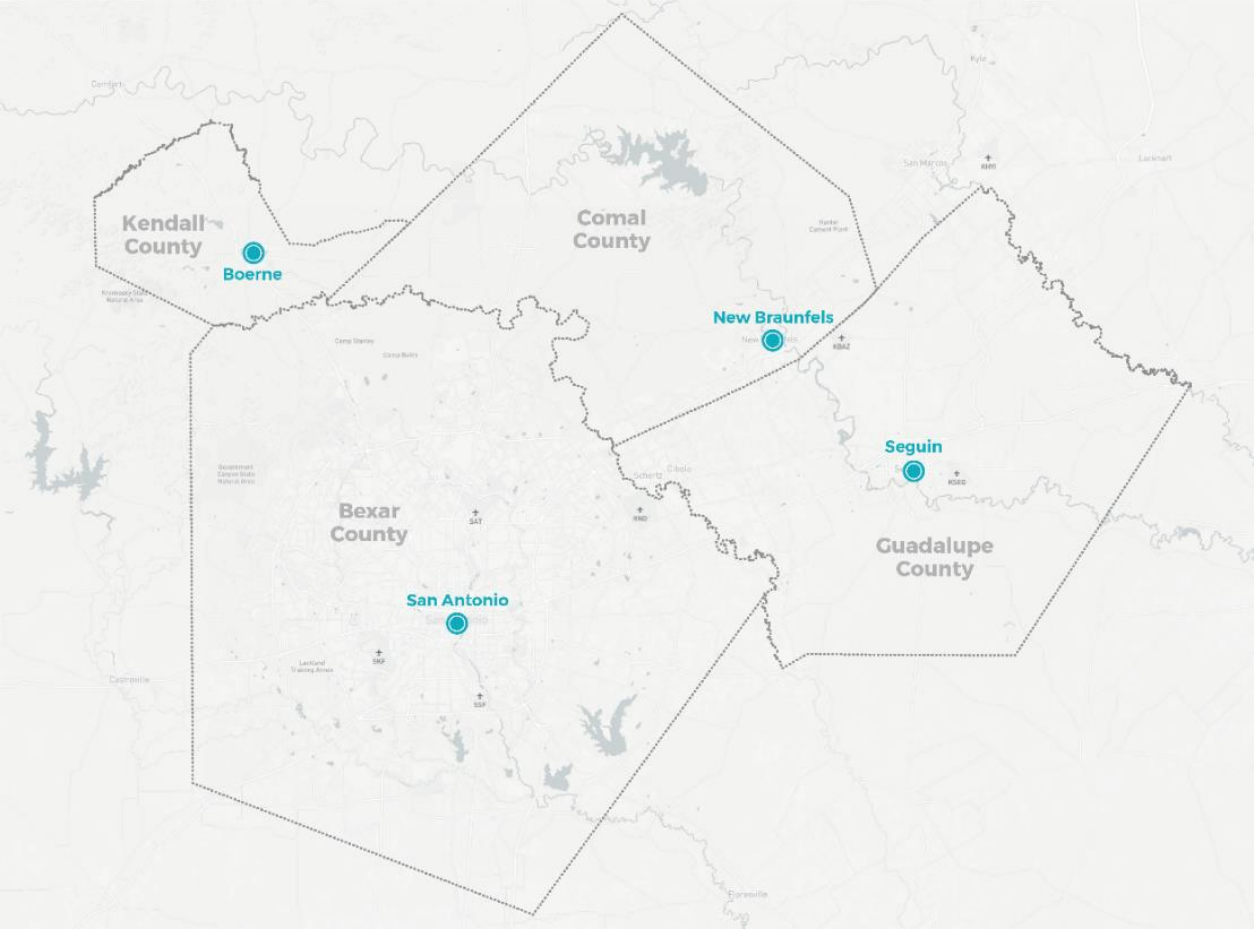


Figure 1: The Alamo Area Bike Share Master Plan Study Area.

1.1. Shared Mobility

The term "shared mobility" is used to describe transportation systems that make use of a pool of resources that can be used by a broad group of people to increase their transportation and mobility options. For this report, "shared mobility" refers to traditional docked and dockless bike share, e-assist bicycles within a bike share platform, and e-scooter programs.

1.2. Background

San Antonio is the largest city in Bexar County and one of the fastest growing cities in the United States.[1,2] The City has focused a lot of its recent growth on innovation, technology, and redevelopment. Systems such as shared mobility transportation are important solutions that supplement existing transit services, provide health and economic benefits to the communities they serve, and advertise the city as a vibrant and modern city to help attract talent.

The region's economy is comprised of government, medical services, manufacturing, business, tourism, technology, and communications. South-central Texas is home to several Fortune 1,000 companies, new tech startups, and a number of universities and colleges, including the University of the Incarnate Word, Trinity University, Our Lady of the Lake University, St. Mary's University, and the University of Texas – San Antonio. There are numerous examples of public-private partnerships that are funding these initiatives, including San Antonio Bike Share.

San Antonio has traditionally been an auto-oriented city. However, more recently, it is recognized that a more sustainable transportation model is needed to support growth. This includes increased funding to enhance transit, active transportation, and other low-impact transportation modes. As an example, VIA, the regional transit agency, is investing in several rapid transit lines and recently upgraded their fare system to be easier to use and more accessible. The City of San Antonio is a bronze-level Bicycle Friendly Community and continues to build out a network of separated bikeways and AAMPO recently sponsored an update to the region's bicycling and pedestrian plans to help prioritize investment in these modes. All of these efforts demonstrate a commitment to changing the transportation culture and shared mobility will both benefit from these changes and help to push them.

1.3. Shared Mobility in San Antonio

San Antonio was one of the first cities in the United States to embrace the modern form of bike share. The bike share program has grown from 14 stations and 140 bikes in 2011 to 61 stations and 535 bikes currently. It operates in the center of San Antonio between Interstates 10 and 37 and extends from the Witte Museum along the Mission Reach to Mission Espada. The attractions along the San Antonio River are some of the most popular stations in the system.

San Antonio Bike Share (SABS) is the non-profit organization that was formed specifically to manage the bike share program and was chosen through a competitive bidding process. A contract was signed in June 2010 between SABS and the City of San Antonio's Office of Sustainability. Equipment, including the bikes and stations, is purchased through a variety of funding sources including federal, state, and local grants and then held "in trust" by the non-profit. Operating funds come from a combination of user revenues, sponsorships, and local public subsidies. In fact, the system was renamed Swell Cycle in early 2018 after the Steward Health Care System became the official title sponsor.[3]

In Summer 2018, new mobility options arrived in San Antonio. A number of companies placed e-scooters on the streets without permits and although they were allowed to keep operating, the City of San Antonio reacted by developing dockless mobility regulations and recently launched a six-month pilot program to trial this equipment.

[1] U.S. Census Bureau
[2] https://www.texastribune.org/2018/05/24/texas-census-san-antonio-tops-national-list-population-houston-growth/
[3] http://tpr.org/post/san-antonio-b-cycle-gets-title-sponsor-becomes-swell-cycle

2. San Antonio Bike Share (SABS)

The existing bike share program launched in 2011 with 14 stations and 140 bikes and now has 61 stations and 535 bikes. When it began, SABS was the first bikeshare program in Texas and in seven years, the program has experienced over 500,000 trips and reached over 100,000 users.[4]

Figure 2A shows ridership trends and the increase in the number of stations from 2014 to 2017. Ridership peaked in 2014 at just over 120,000 trips and has since decreased each year even though the number of stations has steadily increased. There were just over 80,000 trips taken in 2017.

Trends in membership sales are shown on Figure 2B. The number of short-term memberships sold each year stays fairly consistent at around 30,000 sales. In 2014, SABS introduced a monthly membership option that has grown in popularity. This has replaced some annual membership sales, which have decreased over the past 4 years.

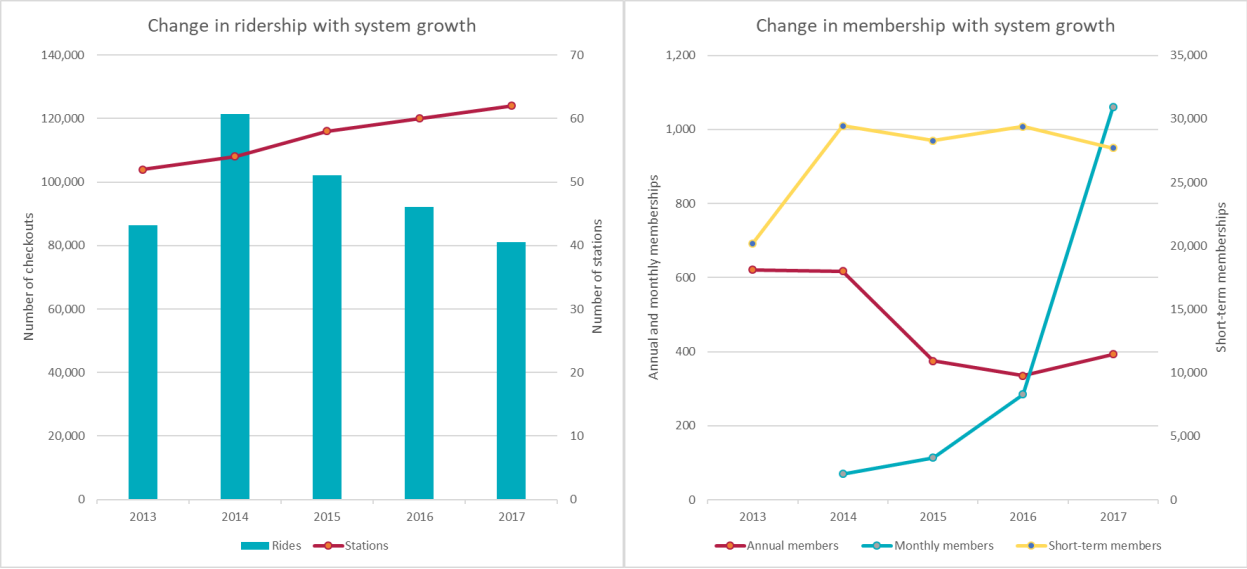


Figure 2: System ridership (left) and membership sales (right) for San Antonio Bike Share between 2013 and 2017.

Table 1 shows the number of trips taken in 2017 by each membership group. Three-quarters of ridership is taken by short-term members who include visitors and tourists. This group tends to be less price sensitive and generally keep the bikes checked out for longer. They often incur overage fees for exceeding the 60-minute "free ride period", which contributes to system revenue.

Table 1: Ridership Characteristics for San Antonio Bike Share in 2017

Member Type	2017 Trips	% of Trips	Average Distance (miles)	Average Duration (mins)	% Trips > 60 mins	Overage Fees per Trip
Annual	13,334	17%	2.4	20	1.0%	$0.04
Monthly	6,796	8%	3.3	29	0.5%	$0.02
Short-term	60,950	75%	5.5	45	11.1%	$0.47
Total	**81,080**	**100%**	**4.8**	**40**	**8.5%**	**$0.36**

[4] https://www.sanantoniobikeshare.org/impact-and-reports.html

Station ridership is shown on Figure 3 and shows that the most popular stations (also listed in Table 2) include most of the major visitor attractions along the San Antonio River Trail including the Pearl, the Alamo, Hemisfair Park, Blue Star, and the San Antonio Missions.

The bottom performing stations in 2017 included several stations that had been recently relocated. Poor-performing stations were analyzed more closely as part of the system optimization plan included in Chapter 5.

Table 2: Top and Bottom Performing San Antonio Bike Share Stations in 2017

Top 10 Performing Stations
Blue Star
Mission San Jose
Mission Concepcion
Mission San Juan
Hemisfair Park
Pearl Brewery
Pearl Culinary Gardens
Concepcion Park
Alamo Plaza
Mission Espada
Bottom 5 Performing Stations
Ellis Alley
S.A.W.S.
101 W. Evergreen
2332 N St. Mary's
Hays Street

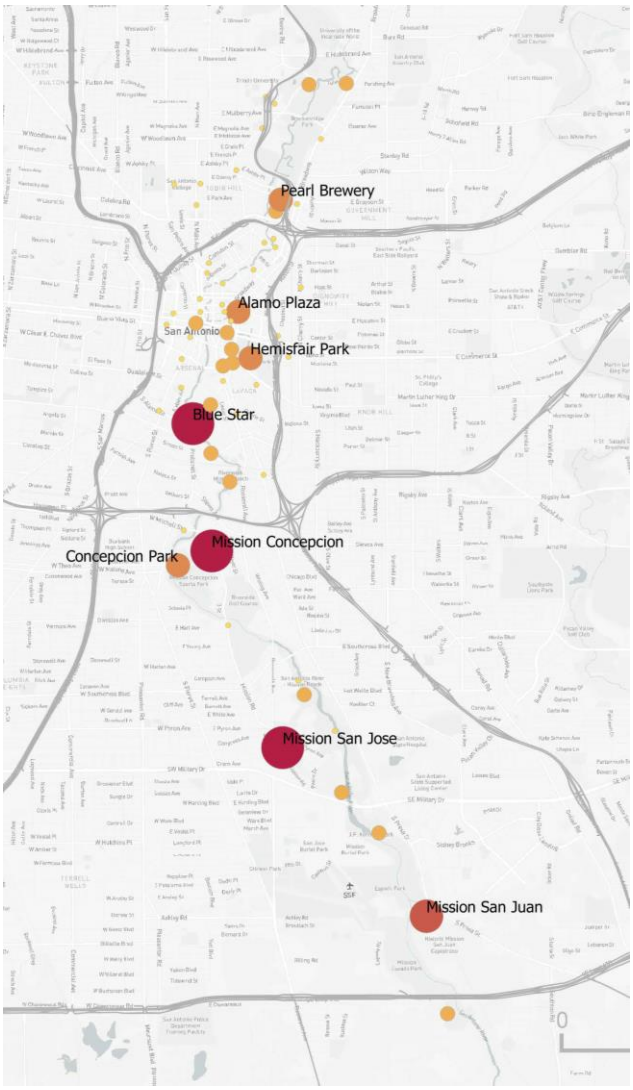


Figure 3: Map of most popular San Antonio Bike Share stations by ridership (2017).

SABS introduced several changes to its pricing structure in early 2017. The changes included an increase in the cost of a day-pass from $8 to $12, a more cost-effective $18 monthly membership, and an increase in the time of the "free-ride period" from 30- to 60-minutes. Ridership and membership statistics were compared for the 12-month period before and after the change and are summarized in Table 3. The following trends were identified:

- Ridership decreased, perhaps in part due to the increased cost of a day pass, but mostly because of the increase to a 60-minute free-ride period, which meant that bikes did not need to be checked in and checked back out as often. As a result, the trip duration increased and overage fees decreased.
- The number of annual and short-term members decreased as users switched to the more cost-effective monthly option.
- Although the number of trips and collection of overage fees went down, total revenue went up from the increased price of the day pass and the increased popularity of the monthly pass.

Table 3: Comparison of System Statistics before and after Price Changes

	Before Price Change (2016)	After Price Change (2017)	Percentage Change
Trips	103,412	81,167	-22%
Trip Duration (mins)	29.6	35.6	+20%
Annual Members	405	365	-10%
Monthly Members	144	805	+459%
Short-term Members	32,795	30,594	-7%
Average Overage Fee	$0.66	$0.35	-46%
Total User Revenue	$363,000	$398,000	+9%

Figure 4 maps the zip codes that annual members provided when they signed up for the program. There is a significant membership base in Alamo Heights, the Eastside Promise Neighborhood, Denver Heights, and Highland Park even though there are few or no stations in these areas. This suggests that there is a latent demand that could be captured if more coverage was provided to these areas.

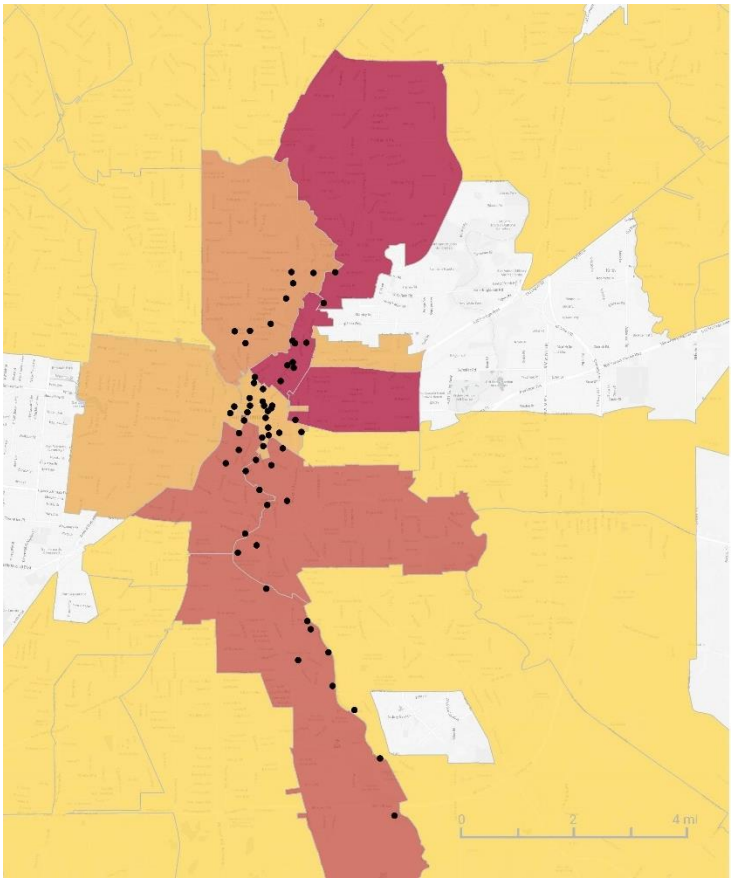


Figure 4: Density of San Antonio Bike Share annual members by zip code (2017).

3. The Changing Face of Bike Share and Shared Mobility

When San Antonio Bike Share (SABS) started, smart dock systems were the only technology option. In the last few years technology options have expanded to include dockless bikes, e-assist bikes, and dockless e-scooters. There are advantages and disadvantages to each of these technologies, which are outlined in the technology feature sheets on the following pages.

3.1. Changes to BCycle Technology

BCycle, owned by Trek, was the first bike share company to have a significant presence in the United States. Their initial system design is a smart dock model, which has been launched in over 50 cities, including San Antonio. BCycle has continued to develop its product and their technology options now include electric pedal-assist and smart bike options.

Most of BCycle's established systems are equipped with their 1.0 and 2.0 technologies. Both technologies are smart dock and require the bikes to be redocked at a station. They are compatible and the 2.0 model includes some aesthetic and componentry upgrades on the bikes. In May 2018, BCycle launched their first smart bike system in Memphis, TN. This product was developed to keep up with how the bike share industry is changing with more flexibility required as systems expand into lower density areas and users desire more flexibility in where they can park. The smart bike does not require docks and uses a built-in U-lock. Bikes can be parked at stations, regular bikes racks, or other street furniture. This reduces the need for station infrastructure, which is the most expensive part of a smart dock system.

BCycle will continue to support the smart dock systems in existence but is transitioning their focus to the new smart bikes. For cities with smart dock systems such as San Antonio, this means that they will need to transition to the new product over time. BCycle is working on two new developments to their product. They recently launched e-assist bikes as pilot programs in Broward County, FL, Los Angeles, CA, Madison, WI, and Philadelphia, PA. These use a battery pack attached to the bike that needs to be replaced and recharged once the charge is emptied. They also have striker loops on the front of the bike so they can, for now, be docked at a 1.0 or 2.0 station.

The second development is an attachment that can be placed on any 1.0 or 2.0 bike with a universal blue tooth lock that will allow the existing docked bikes to operate like dockless smart bikes. This will help to ease the transition from the existing program to a dockless smart bike program.

Technology Feature - Smart Dock Bike Share

Smart dock systems are organized into stations with each having a computerized terminal to process transactions and a series of docks that lock and unlock the bikes. The technology for tracking and locking the bikes is contained in the dock rather than on the bike. Although the system in San Antonio includes an additional lock on the bike to allow for mid-trip stops, the user must return the bike to a station to end their trip. The smart dock system in San Antonio is provided by B-Cycle, who is an established company that continues to develop their product. They recently created an e-assist bike that will be compatible with their stations and could reduce some barriers to entry including steep terrain and hot weather conditions.

Figure 5: A smart dock bike share station in Downtown San Antonio.

Pros

- Established system in San Antonio
- Stations are visible and iconic
- Organized
- Proven and tested technology
- Reliable for users to find a bike

Cons

- Siting requires long contiguous space (e.g., 42-feet for a 15-dock station)
- More expensive technology
- Relies on more components
- More time to implement
- Station capacity limitations (e.g. less flexibility to add more bikes quickly)

Technology Feature - Dockless Bike Share

Dockless bike share systems incorporate the check-out technology and locking mechanism on the bike itself making docking points unnecessary and introducing more flexibility to the system. There are two types of dockless bike share:

- **Smart bike** systems: that are generally a more robust bicycle design (similar to docked bike share bikes), have a built-in cable or U-lock that allows the bikes to be locked to a bike rack or other street furniture, are checked out using a pre-purchased membership, and often use branded hubs or geofenced bike parking to create hubs and encourage bikes to be returned to centralized locations. These systems are often referred to as “lock-to” technologies.
- **Self-locking** systems: use a wheel-lock so that the bike can be locked to itself. However, this does not allow the bike to be locked to a bike rack. Users sign up using an app and then scan a Quick Response (QR) code to check-out a bike. Some vendors have created preferred parking areas using paint or other sidewalk designation to encourage bike return to these locations.

Figure 6: Explore Bike Share in Memphis, TN has "lock-to" technology allowing it to be parked and locked to a bike rack or other street furniture using the U-lock (shown stored in the basket). Source: https://www.flickr.com/photos/paulwasneski/42430241095

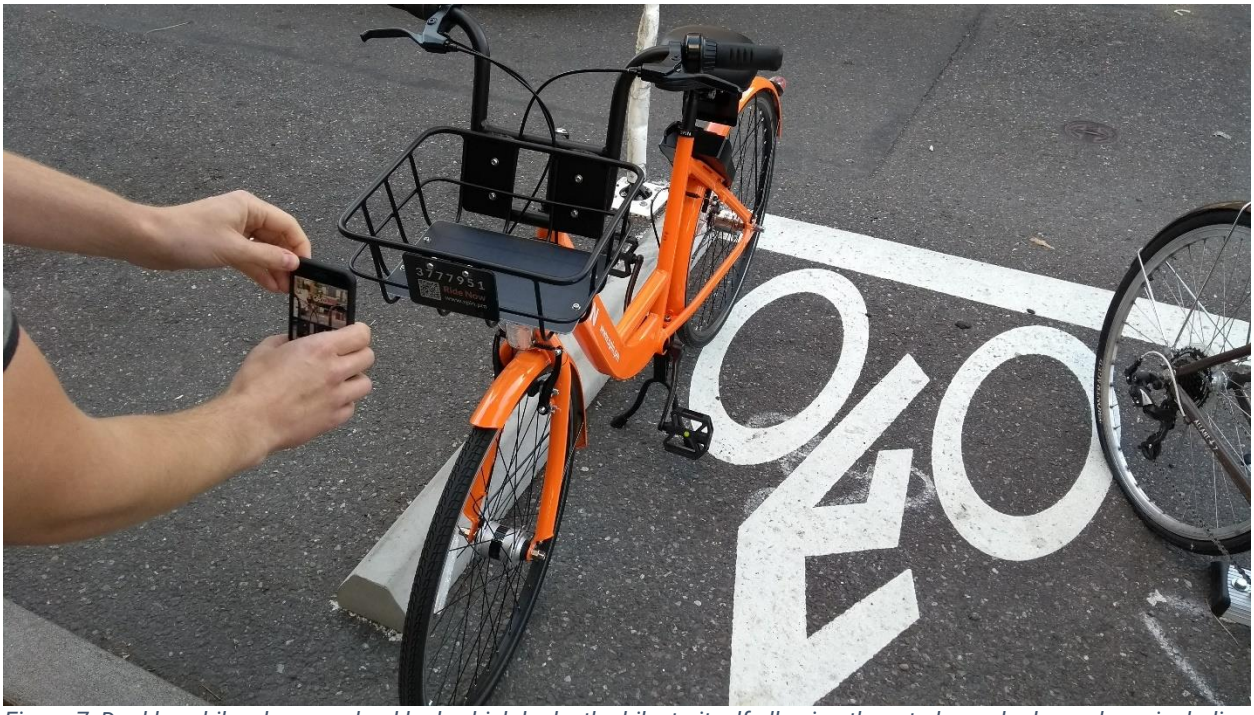


Figure 7: Dockless bikes have a wheel lock which locks the bike to itself allowing them to be parked anywhere, including in this designated parking area in Seattle.

Pros

- More flexibility for where users can park a bike
- Scalable for small or large systems
- Easy to access and use

Additional benefits of smart bikes:

- U-lock or cable lock is understood and encourages locking to a bike rack
- Hubs are organized and visible reminders of the program

Cons

- Less organized. Bikes can be locked to themselves and can be left anywhere
- Can be less reliable for users to find a bike in certain areas
- Less agency control. Many dockless providers do not provide an option for the city to own the program

Technology Feature - E-Scooters

E-scooters are the most recent shared mobility technology. They are similar to dockless bike share, except that they use electric-powered scooters instead of bikes. The e-scooters are equipped with a GPS unit, a self-locking mechanism, and are located and checked out using a smart phone app and then scanning a QR code.

They can be picked up and dropped off anywhere in the service area, although some companies encourage designated parking locations through geo-fencing or photo verification. E-scooter systems are owned and operated by third party, for-profit companies. Bird, Blue Duck, Lime, and Razor are the companies currently operating in San Antonio.

Pros

- More flexibility for where users can park a scooter
- Easy and fast to implement
- Scalable and good for small or large systems
- Minimal cost to cities
- Easy to access and use

Cons

- Less organized
- No capacity to carry items
- Less agency control. No scooter companies provide an option for the city to own the program
- Less reliable for users to find a scooter
- Motorization and operating speeds can introduce conflicts with pedestrians

Figure 8: E-scooters from three different companies in Downtown San Antonio.

Figure 9: E-scooters are checked out by scanning a QR code.

3.2. San Antonio's Dockless Pilot Program

Dockless bike share arrived in the United States in 2017 and expanded quickly to now be in multiple cities. Some of the early adopters were Seattle, WA, Washington D.C., and Dallas, TX and these cities set up different regulatory frameworks to manage the operation of these programs that provided valuable experience to other cities. The dockless industry has seen significant technology changes since then with the introduction of e-assist bikes and e-scooters.

The introduction of e-scooters is more recent and has had a big impact on shared mobility. These devices are easy to check out and to operate, have fewer barriers to entry than bicycling, appeal to a broader demographic, and are compact so fit more neatly into the urban environment alleviating some of the urban clutter created by dockless bikes. The success of e-scooters has also changed the focus of the industry. Although there are companies that still offer a full range of dockless bikes, e-assist bikes, and e-scooters, more companies are now either focused on e-scooters or provide only e-scooters.

There were indications in late 2017 that dockless bike share vendors were interested in coming to San Antonio and the City considered drafting dockless bike share policies as early as January 2018. However, dockless bike share never arrived and it was not until June 2018 that Bird launched a fleet of e-scooters that were deployed without City approval and were quickly followed by several other companies that the City responded by creating policies around shared mobility. Prior to these policies, it was estimated that as of October 2018 there were more than 3,000 e-scooters operating in San Antonio.

In October 2018, Council approved a 6-month pilot program that established a permitting process and clarified the rules around dockless vehicle operations.[5] The pilot permit is available for dockless bikes, e-assist bikes, and e-scooters and has:

- No limits on the number of companies or the number of devices that can be provided,
- An annual permit fee of $500 per company plus $10 per device,
- Provisions giving companies 2-hours to address a reported parking issue (or 1-hour in sensitive locations such as parks, plazas, and trails),
- Parking requirements to ensure devices are parked to maintain a minimum ADA clearance of 36" on the sidewalk and not block bus stops, curb ramps, building accesses,

Portland, OR Scooter Pilot Program

Portland, OR launched a 120-day scooter pilot program from August to November 2018. During the trial they surveyed e-scooter users to evaluate the program. More than 4,500 people responded, and the results suggest scooters are popular amongst those that use it:

- 30% of respondents said they most frequently used e-scooters to commute to work, school, or a work-related meeting.
- Relating their last e-scooter trip, 48% of tourists said they would have driven a personal car (14%) or hailed a taxi, Uber, or Lyft (34%).
- Amongst respondents, e-scooters appear to be more popular among men (62%) than women (36%).
- All respondents – Portlanders and visitors – prefer to ride e-scooters on the street, in the bike lane. Riding on sidewalks was the least preferred option.
- E-scooters are bringing new Portlanders to personal mobility. 45% of respondents reported "never" biking and 78% had never used BIKETOWN prior to using e-scooters.

Source: Portland Bureau of Transportation (https://www.portlandoregon.gov/transportation/article/700917)

[5] City of San Antonio Council Meeting Agenda for meeting conducted on October 11, 2018. File accessed on October 22, 2018 from: https://sanantonio.legistar.com/DepartmentDetail.aspx?ID=22661&GUID=999BA422-A775-4DE3-8ABD-1B4851E69C96

and other street furniture. Downtown Centro ambassadors will help address parking issues and record these occurrences,
- Rules that require riders to use a bike lane when one is available or if using a sidewalk to yield to pedestrians and maintain a 2-foot buffer, and
- Rules that restrict the use of motorized e-scooters in parks, plazas, on the River Walk, or on park and river trails.

To ride an e-scooter in San Antonio costs $1 to unlock and $0.15 per minute to ride. The e-scooter can be parked anywhere at the end of a trip. They are ideal for very short trips (under 10 minutes). A cost comparison with the SABS single-ride trip (see Figure 10) shows that the cost-effectiveness of an e-scooter diminishes for trips longer than 13-14 minutes.

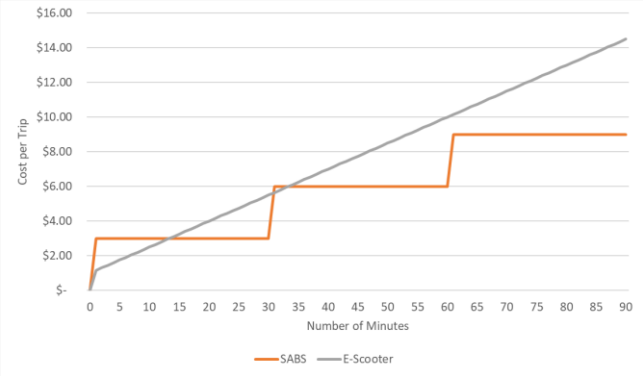


Figure 10: Cost comparison of trips taken on an e-scooter and a single-ride San Antonio Bike Share membership.

The e-scooter companies hire causal workers to pick them up and recharge them each evening and then place them back on the street the next morning.

One of the biggest challenges for e-scooter programs is understanding where they should be ridden. Some users will prefer to ride in the street, especially where there is a separated bike lane, but others will be more comfortable riding on the sidewalk. With maximum speeds of 15 – 20 miles per hour, sidewalk riding can introduce conflicts with pedestrians. As well, very few riders wear helmets or other safety equipment.

Given how new this technology is, there is no established research on the safety performance of e-scooters. However, there are anecdotal reports that show the following:

- Interviews conducted with emergency rooms in Santa Monica, San Francisco, Austin, Atlanta, and Nashville suggest that injuries such as broken wrists and shoulders, facial injuries, and head trauma are being observed from incidents involving e-scooter riders.[6]
- Kansas City conducted a review of its EMS records and identified that:
    - E-scooter riders reported 19 incidents over a four-month period.
    - Of these, 1 person was transported to emergency, 11 were treated in hospital, and the remainder refused treatment or cancelled their call.
    - Injuries included 4 probable fractures or dislocations, others were abrasions and pain in the limbs.
    - Three incidents involved motor vehicles and the remainder were riders losing balance and falling.[7]
- Two fatalities have been recorded nationally, both occurring in September 2018. It is unclear how the observed fatality and injury rates compare with private bicycling, bike share, or other modes of transportation.[8]

[6] Washington Post article. Accessed on October 22, 2018: https://www.washingtonpost.com/business/economy/scooter-use-is-rising-in-major-cities-so-are-trips-to-the-emergency-room/2018/09/06/53d6a8d4-abd6-11e8-a8d7-0f63ab8b1370_story.html?noredirect=on&utm_term=.898fd80eb094
[7] http://kcmo.gov/news/2018/few-injuries-related-to-electric-scooters/
[8] Fortune article. Access on October 22, 2018: http://fortune.com/2018/09/22/lime-scooters-fatality-death/

- In September 2018, San Antonio City Council asked police and fire dispatchers to "begin noting when they respond to injuries involving the devices".[9] This data was not available at the time of this report.

3.3. Peer City Examples

San Antonio is not alone in navigating the changing world of shared mobility. There are a number of bike share programs that were established at a similar time to SABS that have had to adapt to the introduction of new technologies and private investment. Some of these are explored in more detail below and provide examples of different paths that San Antonio could follow including:

- Business-as-usual: Denver Bikeshare intends to optimize their system and continue to grow the system as resources allow. They will operate in the same format as previously and promote their longevity and performance record.
- Transition: the BCycle program in Kansas City is currently undergoing transition from its current non-profit ownership to now be owned by the Kansas City Area Transportation Authority. This will help leverage new resources through the transit agency to grow the program.
- Adapt: the non-profit owned and operated system in the Twin Cities of Minnesota issued an RFP to transition their bike share program to a privately-owned dockless system through a request for proposals process.
- Replace: in Seattle, the non-profit run Pronto program was closed down for a number of reasons and replaced with a dockless permit program that allows multiple vendors to operate bike share in the City.
- Protect: the City of San Francisco has protected their exclusive bike share contract with Ford GoBike and banned all other dockless mobility companies from operating in the City's right-of-way.[10]

3.3.1. Denver

Denver Bikeshare was established as a non-profit in 2010 with the specific purpose of overseeing and operating the Denver BCycle program. The system has expanded through grants, sponsorship, and local funding from 50 stations and 500 bikes in 2010 to 89 stations and 740 bikes currently. In 2017, the system recorded almost 350,000 trips and almost one-third of riders combined bike share with another form of public transportation.

In late 2017, the City of Aurora, a nearby suburb, created a permit program for third-party operators to provide dockless bike share in that city. Two companies obtained permits and reported approximately 40,000 rides in the six-month period between October 2017 and March 2018.[11] The program also raised a small amount of revenue for the City that will be invested in pedestrian and bicycle infrastructure.[12] However, since the introduction of a dockless pilot program in Denver (see below), these companies have removed their bikes from Aurora (which reflects a trend in the dockless industry to focus on larger cities).

[9] SA Current article. Accessed on October 22, 2018: https://www.sacurrent.com/the-daily/archives/2018/09/07/police-and-fire-departments-will-start-keeping-tabs-when-accident-calls-involve-scooters?utm_source=widget&utm_medium=articleblog&utm_campaign=rightrail&utm_content=RelatedStories
[10] With the exception of Jump that was already operating in the City and has been "grandfathered" in and operates in the City.
[11] Denver Post article. Accessed on October 22, 2018: https://www.denverpost.com/2018/04/28/aurora-bike-share-programs-ofo-limebike/
[12] https://www.thedenverchannel.com/news/front-range/aurora/dockless-bikes-pulling-out-of-aurora-other-metro-cities

In Denver, the concept of dockless mobility was introduced through the nearby Aurora pilot program and observing experiences in other cities. In May 2018, the Department of Public Works approved ofo to operate a one year, 200-bike pilot program available only to University of Denver (DU) students and faculty in a restricted area around the DU campus.[13]

Within a month of the pilot (late May 2018), e-scooters appeared unpermitted in the Denver right-of-way and the City of Denver ordered them to be removed and started confiscating the scooters while the City worked towards rules to regulate these programs. The City rolled out the terms of a year-long, citywide dockless pilot permit program in June 2018. Five companies are permitted to bring more than 2,000 bikes and e-assist bikes to the city and five companies are permitted to bring more than 1,250 e-scooters. The fees charged are $150 per application, a $15,000 permit fee, and a $20 per vehicle performance bond.[14]

Figure 11: Denver has a dockless bike share program that includes bikes and scooters.

Despite the dockless pilot permit program, Denver BCycle has an established and long-term business model and plans to continue its operation and will compete with the dockless programs. It is planning to update its fleet over time to BCycle's new smart-bike product (called "Dash"), which can operate similar to a dockless system in that the bikes have check-in and check-out technology on the bike itself and an independent lock so the bike can be locked to itself or to bike racks or other street furniture. This will

[13] Streetsblog article. Accessed on October 22, 2018: https://denver.streetsblog.org/2018/02/26/dockless-bike-share-is-coming-to-southwest-city-streets-through-a-university-of-denver-pilot/
[14] City of Denver. *Dockless Mobility Vehicle Pilot Permit Program*. June 2018. https://www.denvergov.org/content/dam/denvergov/Portals/705/documents/permits/Dockless-Mobility-Pilot-Permit-Program-Overview_June2018.pdf

increase the utility and flexibility of the program and remove a large portion of capital costs that goes into purchasing the stations, docks, and kiosks.

3.3.2. Kansas City

Kansas City BCycle was established by BikeWalkKC, an active transportation advocacy non-profit that created a separate arm to take on ownership and operation of the bike share program in 2013. The program launched with 12 stations and 90 bikes and has since expanded using grants from county and local capital improvement funds, district discretionary funds, foundation and developer funds, and other small funders, and is now 41 stations and 240 bikes.

Dockless mobility arrived in Kansas City in Summer 2018 with unregulated fleets appearing in early July. The City created an Interim Operating Agreement later that month that outlined regulations around the operation of dockless bikes, e-assist bikes, e-scooters, and other small vehicles. They entered into agreements with Bird and Lime and made this agreement available to other venders, with each allowed to provide a minimum of 100 small vehicles and up to 500 small vehicles (with increases to the fleet approved based on achieving ridership targets of 3 or more trips per vehicle per day on the existing fleet). Companies pay a $500 regulatory fee plus $1 per vehicle per day.[15]

Figure 12: E-scooters parked on a sidewalk in Kansas City, MO.

For the traditional bike share system, BikeWalkKC is transitioning ownership and oversight of the program to the Kansas City Area Transportation Authority (RideKC). It is intended that this will leverage the greater resources of the transit agency and enhance the synergies between bike share and transit. The change will include transferring all ownership, management, and administrative duties to the transit agency with the non-profit to be retained as the third-party operator contracted to provide maintenance, rebalancing, and other operating services. In advance of this, the two organizations have created an integrated Bike + Bus pass. Transit riders who purchase a $50 monthly bus pass can now contact Kansas City BCycle to have bike share added to their pass for no extra charge. The card then allows them to take an unlimited number of 60-minute bike share trips.[16]

3.3.3. Minneapolis

Nice Ride Minnesota was established as a non-profit organization to oversee and operate a smart dock bikeshare program in 2010. The system was successful in expanding its operations from 65 stations and 700 bikes in Minneapolis and St. Paul to approximately 200 stations and 1,850 bikes prior to the change in ownership in 2018. The non-profit also established a pilot program in Rochester and a low-tech, small-city bike share program in Bemidji.

With the increased prevalence of dockless bike share in the United States, Nice Ride MN decided to change its ownership model and privatize to better compete, lower capital costs, and more quickly expand its services throughout the City. The non-profit issued a Request for Proposals for a private company to take over the program and have exclusive rights to providing bike share in the Twin Cities. Motivate was selected as the successful bidder and the two organizations developed a business plan that included retaining Nice

[15] Kansas City. *Interim Operating Agreement for Implementation of a Shared Active Transportation Operation.* July 2018. http://kcmo.gov/wp-content/uploads/2018/07/KCMOIOABird.pdf
[16] BikeWalkKC. http://bikewalkkc.org/blog/2018/08/announcing-bike-bus-pass-for-transit-users/

Ride employees, introducing new dockless bike technology, creating hybrid stations for docked and dockless bikes, and retaining the non-profit to oversee and phase out the existing bike share equipment that was obtained through federal funding obtained with the assistance of the City.

> WE CHOSE, GIVEN THE SHIFT TOWARDS THE DOCKLESS APPROACH, THAT THE BETTER THING TO DO WAS TO ACT PROACTIVELY AND CHANGE
>
> Bill Dossett, Executive Director, Nice Ride

The system currently operates as a "hybrid" and riders can still use the traditional docked system or the new dockless bicycles provided by Motivate. The first 1,500 dockless bikes were rolled out in September 2018 and the company has a long-term plan to roll out over 7,500 bikes in the next 5-years.[17] Nice Ride will provide designated bike parking hubs using tape, paint, and signage and geo-fence these locations to encourage users to return bikes to these locations. Out-of-hub fees will be charged to users not returning bikes to a hub. The City charges an annual fee of $5 per bike for Nice Ride to operate the program.

Figure 13: A new dockless bike share hub co-located with an existing docked bike share station in Minneapolis, MN. Bikes are different colors to distinguish them and avoid user confusion. Photo: Nice Ride Minnesota.

[17] Nice Ride. *Parking Zones Master Plan.* Accessed on October 23, 2018: http://www.motivateco.com/wp-content/uploads/2018/08/NR_ParkingZones_MasterPlan_DRAFT_forPublicReview_2018_0808.pdf

The City of St. Paul and several other nearby cities did not participate in the RFP process and instead conducted their own procurement. As a result, Lime is now operating dockless bike share in the City of St. Paul. Permit fees are $20 per bike annually and bikes can be ridden from one city to another, but must be returned to the origin city to avoid out-of-system fees.

In addition to dockless bike share, Bird and Lime each launched 100 e-scooters in Minneapolis without City approval. The City prepared a "Low Power Vehicle Ordinance" in July 2018 to regulate the use of these devices and limited the pilot program to the four months between August and November 2018 allowing up to 200 e-scooters in the first two months and 400 in the last two months of the pilot. The City charged companies $20 per scooter to be part of the program.

3.3.4. Seattle

Seattle initially launched the Pronto Cycle Share program as a non-profit owned and operated, smart dock system in 2014. Within two years the program became insolvent and the City of Seattle purchased it with the intention of overhauling and expanding the system and introducing e-assist bikes. The City did not receive its requested funding allocations and as such closed the program in March 2017. There are numerous reasons why the program was not successful including a limited service area, steep topography, frequent rain, and the region's helmet requirement.

Figure 14: Former Pronto bike share station in Seattle, WA.

After the closure of Pronto, Seattle became one of the first cities in the country to embrace dockless bike share. In July of 2017, the city established a multi-vendor permit program that allowed an open market approach for vendors to bring dockless bikes and e-assist bikes to the city (note: e-scooters are not allowed). The permits establish minimum and maximum bike numbers, service level requirements, and other requirements. At the end of the 12-month pilot the City revised its permit terms for the 2018 - 2019 cycle. Under the new terms, not all companies have reapplied.

Seattle's approach requires the least amount of public resources to implement, however, as shown by the fact not all vendors have reapplied, is also the least secure in providing continued and consistent service.

Figure 15: Dockless bike share in Seattle, WA.

3.3.5. San Francisco Bay Area

The Bay Area has a bike share program that is a public-private partnership. Each city has an agreement with the operator and can decide on whether they will allow competing programs. However, the City of San Francisco is an example where the city is protecting its investment in established technology and attempting to control unregulated use of the public right-of-way.

Ford GoBike is a smart-dock system that operates in San Francisco, San Jose, and the East Bay. It has over 300 stations and 3,000 bikes that were provided by Motivate through a contract with the Metropolitan Transportation Commission and the individual cities to grant them exclusive use of the right-of-way to provide bike share services.

Since then, dockless bike share companies have attempted to establish themselves in San Francisco by putting out bikes or scooters on the street. These systems have been stopped through cease and desist orders issued by SFMTA with the exception of Jump, which had an established presence in the City prior to the Ford GoBike deal and is therefore grandfathered in to operate in the City. Jump operates both dockless e-assist bikes and e-scooters in the City.

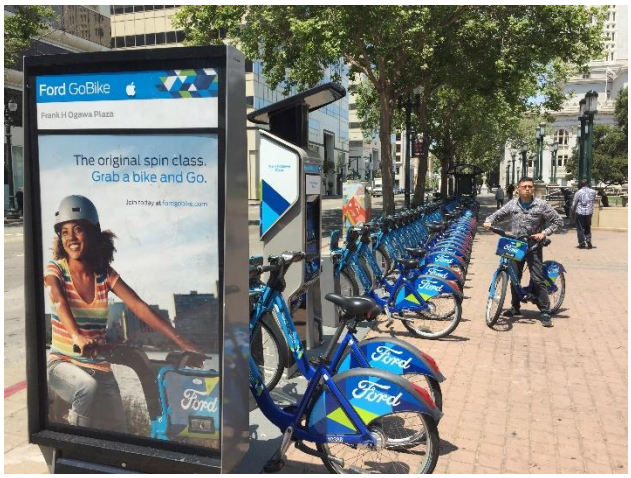


Figure 16: Ford GoBike station in Oakland, CA.

Figure 17: Jump e-assist bikes and e-scooters operating in San Francisco, CA (Source: Jump).

4. The Opportunity for Shared Mobility in San Antonio

San Antonio offers a supportive environment for shared mobility. The policy environment is supportive of new and less resource-dependent modes of transportation and there is general interest amongst public and private stakeholders and the public for new options that improve mobility and can support the city's rapid growth. San Antonio Bike Share (SABS) provides an established service that is well supported in the community and new shared mobility options provide an opportunity for accelerated coverage in areas that would have to wait or may never have received coverage under the resource-constrained bike share program.

However, there are a number of challenges that need to be addressed. The most critical is to prioritize a connected and comfortable network of bicycling facilities. This will most effectively leverage shared mobility programs by engaging the largest group of potential users – the "interested but concerned". The current bike share program must increase its flexibility to provide coverage to new, lower density areas of the city and this will likely require an overhaul of the existing technology.

4.1. Policy Review

The policies, plans, and regulations adopted by the City of San Antonio, AAMPO, VIA, TxDOT, and other local, regional, state, and federal agencies, can impact the planning, operation, and long-term viability of shared mobility in Bexar County. Some plans provide opportunities and a supportive framework for shared mobility while others present challenges that will need to be addressed.

Opportunities

- Growth Accommodation: the population of San Antonio is projected to increase by one million people by the year 2040 and the City has recognized the need for smarter development and to prioritize multimodal transportation if it hopes to address the city's future mobility needs.[18] Expansion of the bike share program and the introduction of other shared mobility modes will assist in the diversification of transportation choices. San Antonio has undertaken significant redevelopment and reinvestment in its Downtown and this renewal has spread to other parts of the City that now boasts higher-density and mixed-use neighborhoods, university districts, and transit-oriented developments.[19,20] These are effective locations for shared mobility.
- Visitor and Tourist Attractions: San Antonio boasts a number of renowned attractions that draw regional, national, and international tourists to the city. These include the Alamo, the Riverwalk, Hemisfair Park, La Villita, the San Antonio missions, the Pearl District, and the Blue Star Arts District. These are generally well connected with bike infrastructure and are the core of the existing bike share system. As other destinations come on-line, e.g., future redevelopment of the Lone Star Brewery, they should be incorporated into the network with comfortable bicycling facilities.
- Public Transit: San Antonio is generally well served by public transit.[21] Bike share stations can be sited at or near existing and future transit stops to provide first- and last-mile connections. VIA has a comprehensive long range plan to increase service (see Figure 18 and Figure 19).
- Community Support for Bike Share: the SA Tomorrow Multimodal Transportation Plan lists as a policy in their five-year action plan to "Transform the BCycle bike share system into a substantive transportation option with 100 stations and 1,000 bicycles." [22] This is one of nine policies aimed at encouraging bicycling in the City. Additionally, the VIA Vision 2040 plan lists bike share integration as an innovative solution for implementation in the current, near-term, mid-term, and long-term time frames.[23]

[18] SA Tomorrow Multimodal Transportation Plan, August 2016
[19] Howard W. Peak Greenway Trails System Plan, City of San Antonio
[20] SA Tomorrow Multimodal Transportation Plan, August 2016
[21] Via Metropolitan Transit, http://www.viainfo.net/, August 2017
[22] SA Tomorrow Multimodal Transportation Plan, August 2016, Section 7, page 20
[23] VIA Vision 2040 Long Range Plan, August 2016, page 44-45

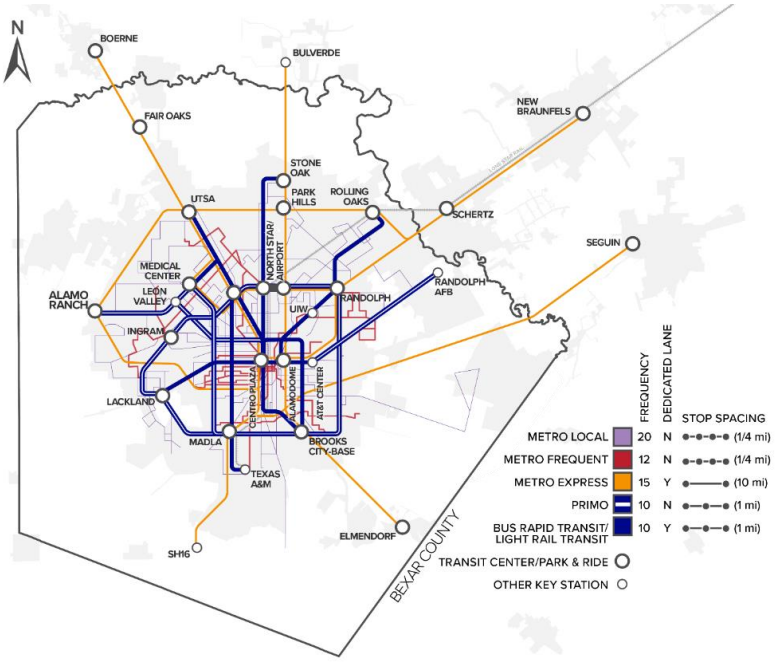


Figure 18: VIA Vision 2040 Long Range Plan Network Map. [24]

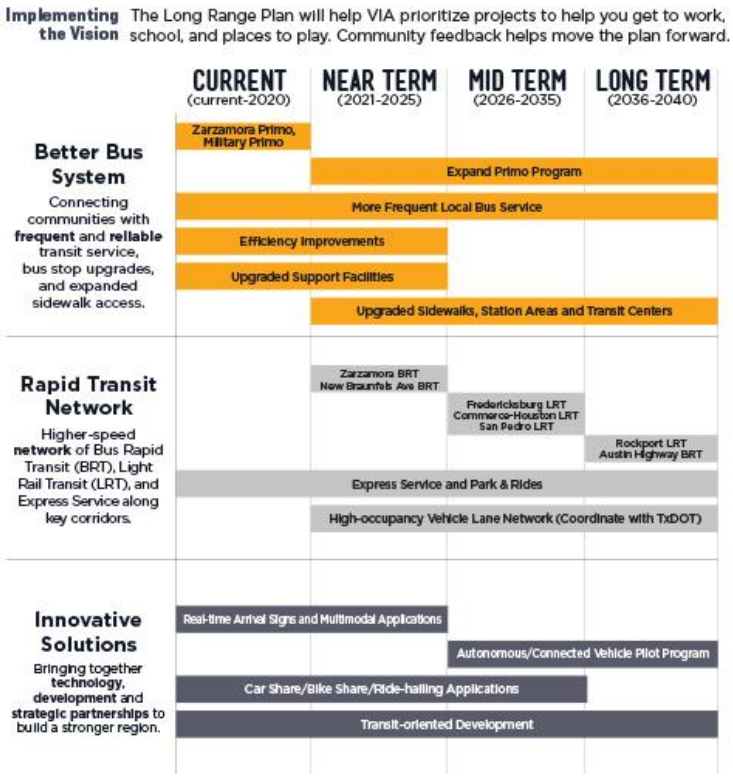


Figure 19: VIA Vision 2040 Long Range Plan Implementation Summary.

[24] http://www.viavision2040.com/vision-2040-long-range-plan/

- Complete Streets Policies: in 2009, the AAMPO Board passed a resolution encouraging each member community to adopt and implement a Complete Streets policy. Since then, San Antonio has adopted a policy to guide the implementation and integration of Complete Streets into new and updated roadway construction.[25] This encourages the City to integrate bicycling infrastructure (and other complete streets elements) into street cross-sections as part of future designs.
- Health and Quality of Life: San Antonio's SA Tomorrow Multimodal Transportation Plan targets the development of a multi-modal transportation system and recognizes that increasing active transportation through bicycle and pedestrian mobility encourages healthy lifestyles and improves overall quality of life.
- Community Support: a number of planning documents[26] show that residents express a desire for more bicycling infrastructure (both on- and off-street facilities), with hike-and-bike trails often ranked as one of the highest needs in their community. Implementing, or expanding, a bike share program could allow a greater percentage of residents and visitors to explore the community via bike.
- Transportation Funding: as part of its Metropolitan Transportation Plan, AAMPO has designated over $90 million of local, state, and federal funding between fiscal year 2017 and 2020 for improvements to the focus communities' on- and off-street infrastructure. Many of these projects incorporate bicycle facilities.[27] In 2017, San Antonio voters passed an $850 million General Obligation Bond Program. Proposition 1 included over $445 million for streets, bridges, and sidewalk improvements and of that, $73 million is allocated towards projects that include bicycle facilities (see Figure 20).[28]
- Targeting Emission Reductions: San Antonio has nearly reached "non-attainment" status with regard to national air quality standards.[29] Bike share can provide an alternative to short-distance vehicular trips and with non-attainment, Congestion Mitigation Air Quality (CMAQ) funds may become available for future capital improvements to the bike share program.
- Bicycle Friendly Community: in 2010, San Antonio received the bronze-level Bicycle Friendly Community Award from the League of American Bicyclists.[30] As such, it has committed to implementing infrastructure, policies, and programs that create a bicycle-friendly environment.

Figure 20: Infographic from the Proposition 1 Campaign. [31]

[25] San Antonio Complete Streets Policy, September 2011
[26] San Antonio Parks & Recreation System Strategic Plan (2006-2016), May 2006
[27] Alamo Area Metropolitan Planning Organization Metropolitan Transportation Plan "Mobility 2040"
[28] City of San Antonio Proposed 2017-2022 Bond Program Information Guide
[29] SA Tomorrow Multimodal Transportation Plan, August 2016
[30] San Antonio Bike Plan 2011 + Implementation Strategy, June 2011
[31] http://www.sanantonio.gov/2017Bond

Challenges

- Incomplete Infrastructure: while there are policies in place to encourage greater bicycle network connectivity, current bicycle infrastructure remains piecemeal in many places and may discourage inexperienced riders from using shared mobility.
- Auto-Centric Development: for many years San Antonio prioritized the development of an auto-oriented transportation system. Even though San Antonio is working toward smarter development patterns, there are still parts of the City with low-density, auto-oriented land uses that can be an uncomfortable riding experience, particularly where bicyclists must share space with vehicles on busy street with high traffic volumes and speeds. The presence of plentiful and inexpensive parking in most parts of the city does not encourage bicycling or non-auto modes.
- Transit Fare Integration: San Antonio Bike Share membership is not currently integrated with VIA's fare payment system. VIA's Vision 2040 Long Range Plan identifies a partnership with the bike share program as a near term goal (2021-2025)[32] and one way this could be achieved is through a program similar to Kansas City's where the bike share provider can add an RFID chip to a transit card that will get the user access to the bike share system with the same card.
- Density of Land Use and Destinations: the core of San Antonio has a dense network of mixed-use areas, recreational areas, and other key destinations. This has been the core business of the bike share program to date. However, other parts of the city are lower density and often single use, which reduces the cost-effectiveness of traditional bike share. This could be an opportunity for dockless systems that have more flexibility and don't require the high cost of stations.
- Economically Disadvantaged Neighborhoods: demographics vary greatly within San Antonio. In those neighborhoods with a higher prevalence of low income and non-white populations, uptake of bike share may be low and require special efforts and programs to increase its use. AAMPO's Mobility 2040 Plan includes an analysis of transportation infrastructure and its distribution to "Environmental Justice Communities".[33] These are defined as locations with 50% or higher non-white population or 50% or more households at or below the U.S. Health and Human Services' poverty guidelines. A similar analysis was conducted as part of this study to help determine future service areas for the bike share program.
- Funding Restrictions: SABS' capital funding has come from federal, state, or local grant funding. For the most part, these funds can only be used for purchase and installation of the equipment including the bikes, stations, kiosks, etc. The equipment is held "in trust" by the non-profit and would revert back to the sponsoring agency of the funding if the non-profit were to dissolve. There are often other requirements around the use of this funding, e.g., some sources such as grants managed by TxDOT require environmental clearance of the proposed station locations, which can limit the flexibility of station placement, or moving stations if a more effective location becomes available.

4.2. Bike Share Market Analysis

The majority of people that use SABS are "casual users" meaning that they are out-of-town visitors or tourists that use the program to get around or are residents that use it only occasionally. The orientation of the system around the city's key visitor attractions encourages this market. Community and stakeholder feedback suggested that any future expansion of the bike share program should expand it east-west to better serve local residents and local destinations including the universities, colleges, parks, community centers, and neighborhoods just outside the inner freeway loop. Table 4 identifies existing and potential market segments for bike share ridership.

[32] VIA Vision 2040 Long Range Plan, August 2016
[33] AAMPO Mobility 2040, Chapter 7 – Roadway System

Table 4. Potential Bike Share Users in San Antonio (informed by stakeholder and public input)

User Type	Current	Potential	Notes
Residents	Low	Medium	The system currently serves only residents living in the service area. There is potential to expand the program further east and west and increase the number of residents with access to the program and connect them to recreational, shopping, and entertainment opportunities
Commuters	Low	Medium	Increasing coverage to where San Antonians live will improve access to employment with a large number of the city's jobs located in the current downtown service area
Employees	Low	Low	The expanded coverage area is unlikely to include many large employment centers which will limit the potential for these trips
Visitors and Tourists	High	High	The system already provides good coverage of the city's major visitor and tourist destinations. However, there are a number of new attractions that could be covered by an expanded system including Woodlawn Lake and the AT&T Center
Students	Medium	High	An expanded bike share system could connect the University of the Incarnate Word, Our Lady of the Lake University, St. Mary's University, and St. Phillip's College to the rest of the system
Someone Else Pays	Low	Medium	There is more opportunity in the current service area and new employers such as the universities to purchase bulk memberships at a discounted rate for their staff, faculty, and students
Supporter [1]	Low	Low	This is generally low for an established system

[1] A "supporter" is someone that pays for membership in the program to support it, but that does not use the program. This is essentially a donation to the program.

4.3. Community Engagement

The project team conducted online and in-person outreach at several community events in late 2017 (prior to dockless mobility coming to San Antonio). The team used an online survey and a crowdsourcing map to gather information on the existing system, preferences for the program, and new locations that people would like to see bike share. The City of San Antonio also conducted a survey and attended public meetings to inform its new dockless mobility permit. Feedback gathered from these public outreach efforts is summarized below.

4.3.1. Bike Share Survey

A survey was developed by the project team and made available from October 10th to December 19th, 2017. It was advertised through the project website, traditional and online media, sent out to current members of San Antonio Bike Share, and made available for people to fill out in person at outreach events attended by the project team. The survey was available in Spanish through a paper version during outreach events.

The survey garnered a total of 577 respondents. 272 were from Bexar County, including 74 current members of San Antonio Bike Share, 40 former members, and 158 non-members. The intent of the survey was to understand how each of these groups uses or perceives bike share to inform program changes and system planning. The survey also included demographic questions to understand who currently uses the system and who is under-represented by the program compared to the demographics of San Antonio.

Figure 21: Comparison of survey respondents' demographics to Bexar County averages.

Key Findings

- The survey generally under-represented younger and older age groups, lower-income groups, lower education levels, and people of color compared to the demographics of Bexar County as a whole.
- **Current members** are more likely to be in their thirties or fifties, have higher income, have higher education, under-represent people of color, and slightly over-represent women compared to the demographics of Bexar County.
- **Among current members**, 95-percent have access to a car, 70-percent have access to a working bicycle, and 51-percent have access to a transit pass.
- **Among non-members**, 98-percent have access to a car, 61-percent have access to a working bicycle, and 35-percent have access to a transit pass.
- **Nearly three-quarters of non-members** had heard of San Antonio Bike Share, most by seeing a station or someone riding a bike. Others had heard about the program from news articles, social media, community events, or from information provided to them at work.
- **Among current members**, the most common trips are taken for recreation and exercise, social engagements such as going to a restaurant or bar and visiting local attractions. Using SABS to commute to work or school was uncommon.

- **Over half of current members** use bike share in combination with another transportation mode, mostly with a car. However, approximately 10-percent of members combined bike share with a VIA bus trip.
- **Approximately 39-percent of member trips** replaced an automobile trip, 30-percent replaced walking, 13-percent replaced private bicycling, and 12-percent replaced a transit trip.
- **Current members** are happy with the service provided by San Antonio Bike Share, but many would like to see more bike share stations and improved accessibility to the system.
- **Among both former members and non-members**, a lack of stations in convenient locations, preference for using one's own bike, and high membership costs were the top barriers to using the program.
- **Among non-members**, there were many comments about the City needing to prioritize comfortable and safe bicycling infrastructure to encourage more bicycling.

"Most current members engage in bike share by seeing the stations or bikes. Former and non-members cited a lack of conveniently located stations as a factor in them not using the system."

4.3.2. In-Person Outreach

The project team conducted in-person outreach at the Siclovia held in San Antonio in October 2017 and attended several "bike nights" hosted by AAMPO staff. Outreach materials and links to the survey were also distributed at events attended by San Antonio Bike Share staff and members of the Stakeholder Oversight Committee.

At these events, information about the project was displayed on project boards and a second project board was used to collect feedback on the system and locations for future bike share expansion. iPads were set up for participants to take the survey or use the crowdsource map. An example of the input collected at these events is shown on Figure 22.

The 2017 Siclovia was the best attended public event and staff spoke with approximately 60 people including San Antonio residents and out-of-town visitors, and people of different ages and racial/ethnic groups. Quite a few people were aware of bike share or had used it, but many had never heard of it.

From the input provided on the project boards, there were a variety of locations suggested for expanding the existing bike share system including extending west to Our Lady of the Lake University, St. Mary's University, and Woodlawn Lake; and expanding east into the inner east-side neighborhoods. There were also a number of suggestions for the system to have a presence at Olmos Park, Brooks City Base, and Leon Valley. There were also suggestions for stations at large destinations such as the AT&T Center, the San Antonio International Airport, Quarry Village, and the University of the Incarnate Word. Several people suggested that there should be bike share stations near La Cantera, which was not shown on the board. Suggestions collected from in-person public outreach were combined with the crowdsourcing map below.

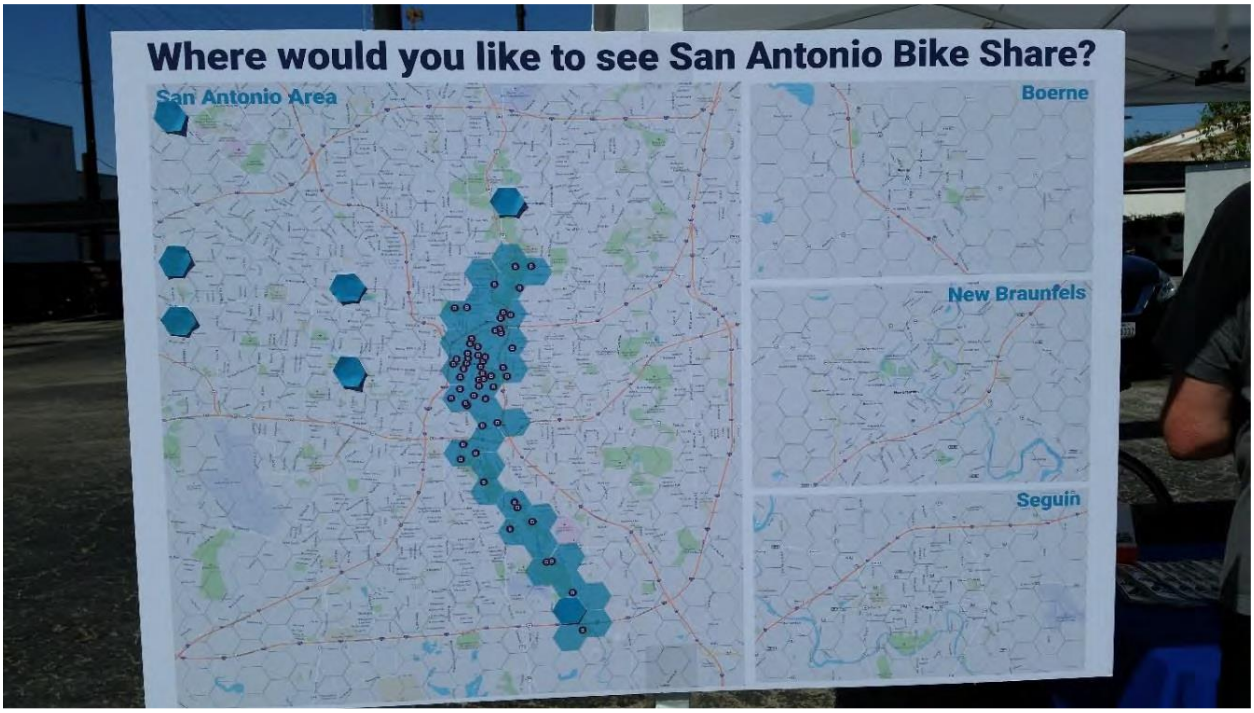


Figure 22: Example of bike share expansion areas suggested by a member of the public at Siclovia 2017.

4.3.3. Crowdsourcing Map

An online map was developed for users to identify locations where they would like to see bike share or they could like or dislike other peoples' suggestions. The map was available from October 10th to December 19th, 2017 and was promoted through both traditional and online media and at outreach events attended by the project team.

Regionwide, the map had a total of 157 unique users that suggested 263 potential bike share station locations, including 185 locations in San Antonio. Those 185 locations received 154 votes of support. Figure 23 shows the suggestions in the area immediately surrounding the existing program and shows that there is support for bikeshare outside of the current service area including in Alamo Heights, Quarry Village, and the eastside and westside neighborhoods. Previous studies conducted by the project team have shown that ridership is correlated to crowdsourcing results and as such, these results were considered highly in planning future expansion and station relocation decisions.

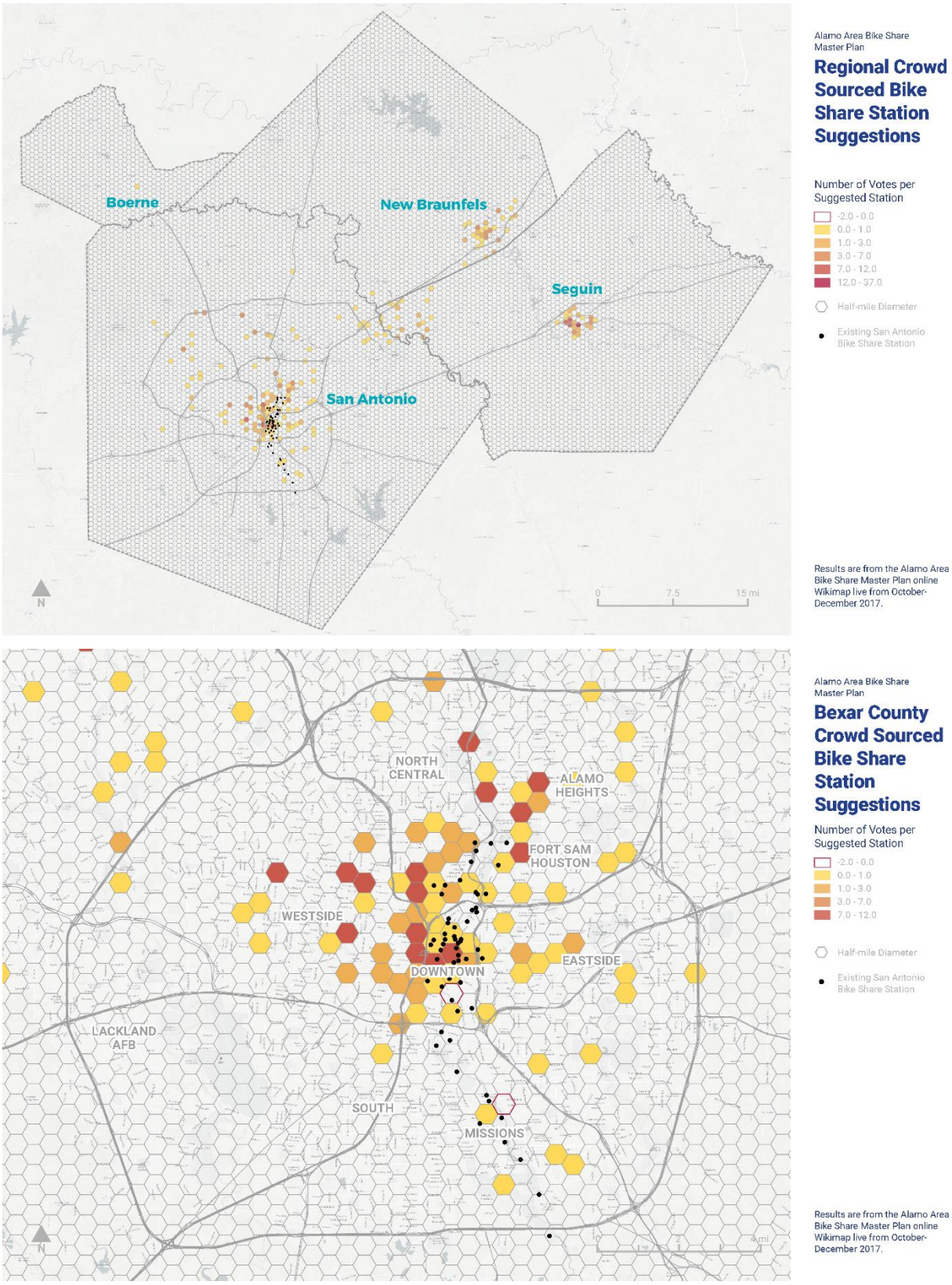


Figure 23: Crowdsourcing suggestions for future expansion of San Antonio Bike Share (Bexar County).

4.3.4. Dockless Mobility Outreach

City staff conducted outreach separate to this project to inform the development of their dockless mobility pilot program. That included several meetings with key stakeholders, meetings with all the interested vendors, an online survey (approximately 3,800 responses), and a public open house conducted on July 31, 2018 (approximately 150 attendees). Some of the outcomes reported from this outreach included:

- Most survey respondents (approximately 75%) were positive or somewhat positive about dockless vehicles saying that they liked the flexibility, convenience, and affordability of this option.
- Approximately 20% of respondents (approximately 700 people) were very or somewhat negative about dockless vehicles. These people most frequently cited concerns about safety, uncertainty about where they are supposed to operate, blocking sidewalks and curbs, and riders not obeying traffic laws.
- Half of respondents believed that dockless vehicle riders should be required to wear helmets.
- The majority of respondents believed that dockless vehicles should follow the same traffic regulations as bicycles (82%) and that they should be charged a fee for leaving vehicles where parking is prohibited (87%).

4.4. Stakeholder Outreach

Stakeholder outreach informed the project team of the major opportunities and challenges and assisted in the design of potential shared mobility solutions in San Antonio. Stakeholder outreach included regular meetings with the Study Oversight Committee (SOC), which was comprised of representatives from the City of San Antonio and other local, regional, and partner agencies. Activities conducted with the SOC included an opportunities and challenges assessment, identification of potential users of the program, and the *AAMPO Bike Share Board Game* (see Figure 24), that helped identify what type of bike share system should be implemented where in San Antonio (see Figure 25).

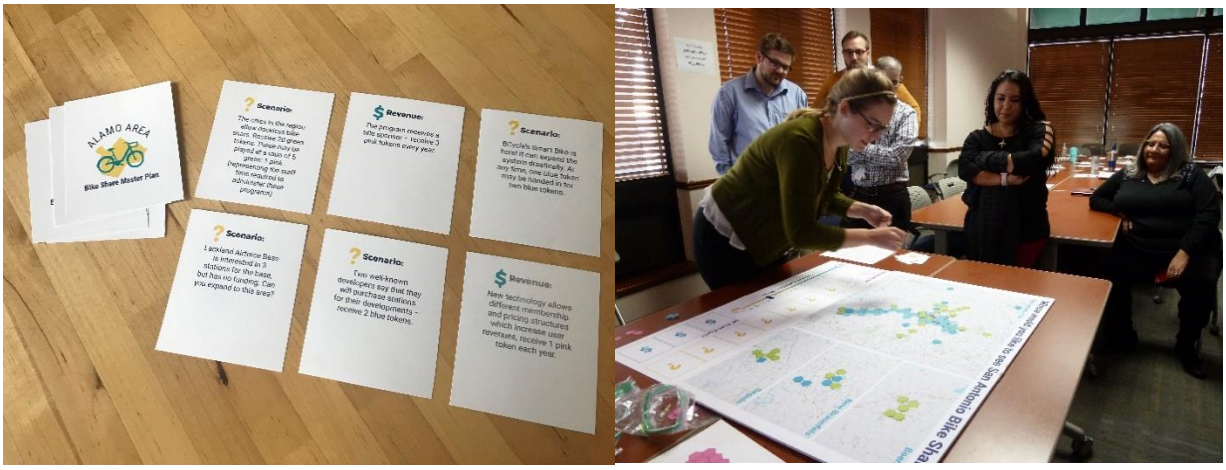


Figure 24: The AAMPO Bike Share Board Game.

Figure 25: Results from the AAMPO Bike Share Board Game.

The project team also conducted interviews and meetings with staff from the City of San Antonio, AAMPO, VIA Transit, and SABS. These meetings were used to identify opportunities and challenges and determine these agencies' role in supporting shared mobility. Below is a summary of stakeholder input grouped into common themes.

Encourage Ridership

- Developing a more comprehensive and connected bikeway network would support shared mobility and the combined ridership from San Antonio Bike Share, the e-scooter program, and private bicycling would then help to encourage further investment in the network. Comfortable and separated east-west bikeways will be needed to provide structure to the east-west expansion of the program.
- E-assist bikes should be considered to counter the effects of extreme summer heat and areas with steep topography. They may also encourage new people to try bike share and introduce them to bicycling.
- Programs that provide access to a broader range of bicycle types will help to engage people with physical disabilities, families, and others special needs.
- Education is needed to show residents that the program is not just for tourists. Additional effort may be needed in traditionally underserved communities where there are additional barriers including language, access to financial services, and technology that could impact access.

Expansion of San Antonio Bike Share

- The next phases of expansion should focus on filling-out the system in the east-to-west direction. This can increase coverage for local residents and connect the existing system to key community destinations including universities, colleges, community centers, and parks.
- Smart bikes may provide an effective solution to expand the bike share program into lower density areas of the City. E-assist bikes could also help cover larger distances between destinations.
- SABS or other shared mobility could be an option for Lackland Airforce Base, the Westside Medical Center, or the University of Texas at San Antonio. However, connections to the rest of the City are challenging given the distances and the barriers posed by freeways and large arterial streets.
- Bike share could connect people to VIA's Viva routes and to Primo Station.

Operations and Funding

- Dockless bikes or e-scooters are minimal cost to the City, flexible, and could provide coverage to areas of the city that would otherwise not receive bike share for many years, if ever, under the current business model.
- A hybrid system may be needed to transition the existing system from smart dock to smart bike. This would need to co-locate smart dock and dockless technology until the fleet could be replaced.
- Fare payments could be simplified or incentivized to help reduce barriers and increase ridership. Adjustments to the fare structure should consider bringing it in-line with the e-scooter program.
- A large population of service workers live on the westside of San Antonio and commute into downtown daily. The program should consider a fare reduction or a program where employers can subsidize passes for their employees.
- Partnerships with developers could help fund the program on their properties.
- Continue to highlight the effective performance of the existing system in a number of key transit metrics and recognize the comparatively low cost to operate and maintain the program.

Challenges

- Highways, access roads, and large arterials streets are physical barriers to system expansion.
- Existing policies and ways-of-doing-business still emphasize motor vehicle travel and parking.
- Extremely hot weather could be a deterrent to ridership.
- Agreements will be needed to expand the existing program across multiple jurisdictions, e.g., into the City of Alamo Heights.
- The San Antonio River is a precious resource to the City and its economic prosperity. As well, urban form is important and any system should be well organized and minimize clutter and the opportunity for bikes to end up in the river.
- Some parts of the existing smart dock technology are coming to the end of their useful life where repairs will become more frequent and parts harder to find. The relatively high capital need for smart dock stations is the costliest option with the least amount of flexibility. It is not suited to expanding into lower density areas of the city.

4.5. Potential Demand

Demand for shared mobility is driven by factors such as population, employment, transit, and attractions and destinations that will support trips throughout the day. Bike share demand models have been developed that use existing system data to predict where ridership is expected to be highest. The accuracy of these models is not certain, but they are a good indicator of relative demand.

This study uses the Rixey regression model to map potential bike share demand in the AAMPO region.[34] The model considers total population, retail jobs, the number of non-driving (i.e., walk, bike, and transit) commuters, median income, non-white population, the number of residents with a bachelor's degree, and the number of bike share stations within 4,800 meters (about 3 miles). [35]

The model results for San Antonio are shown on Figure 26 and support public and stakeholder expectations that the highest resident demands are expected to be from the northern part of downtown, Alamo Heights, and the southern part of North Central. There are also a few areas on the west side, near the missions, and near Lackland Air Force Base that are predicted to have high bike share demand. The two areas predicted to have the highest bike share demand in the whole region are west of Fort Sam Houston. Notable portions of the east side, west side, and north central areas are predicted to have relatively high bike share demand.

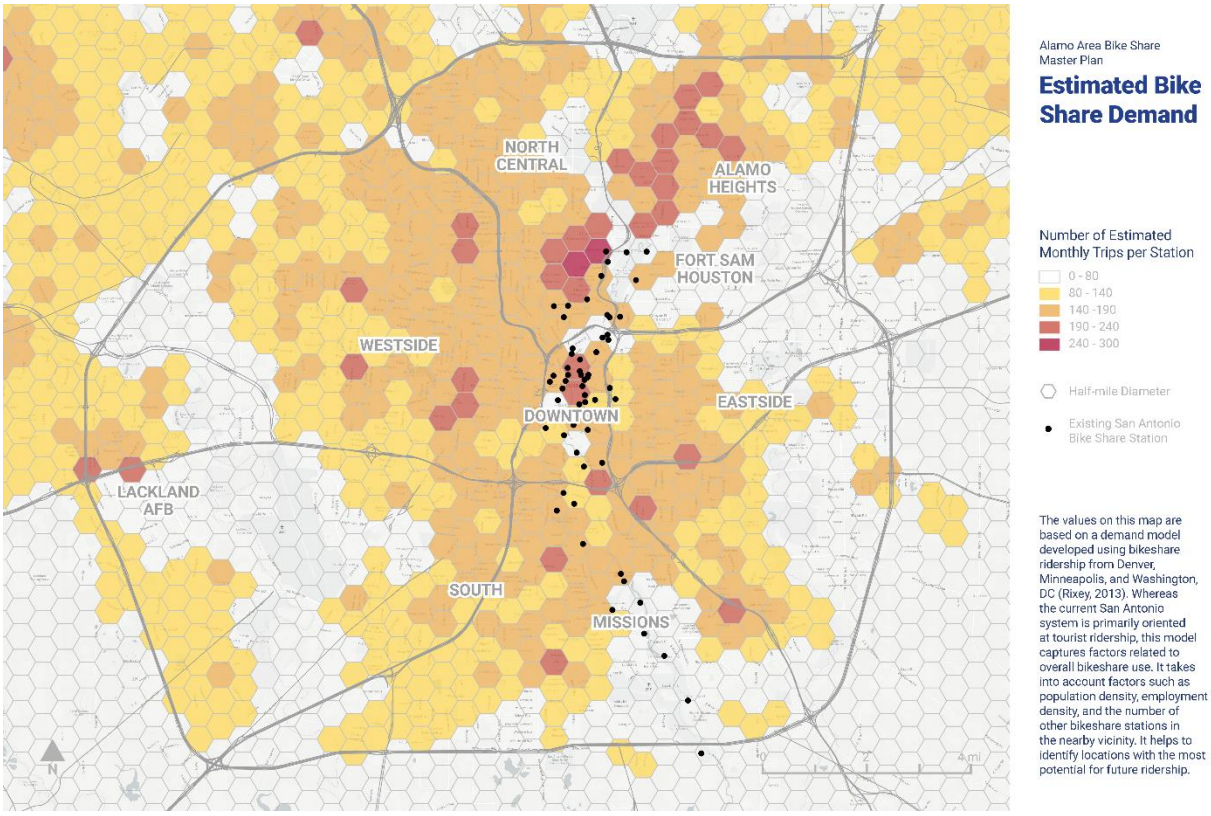


Figure 26: Potential bike share demand in San Antonio.

[34] Rixey, R. "Station-level forecasting of bikesharing ridership: Station Network Effects in Three U.S. Systems." *Transportation Research Record: Journal of the Transportation Research Board* 2387 (2013): 46-55.
[35] The model was applied to hexagonal bins by calculating summary statistics around the bin centroid. Station density assumptions are based on median values in the San Antonio system: for areas with low population density (<500 people / quarter mile) and low retail employment density (<100 jobs / quarter mile): 10 stations per 4,800 meters; for all other areas: 54 stations per 4,800 meters.

4.6. Underserved Communities

The project team conducted an analysis to better understand where there may be opportunities to reach traditionally underserved communities, including lower income households and people of color. These populations also tend to be the most transit-dependent[36] and may benefit from bike share to facilitate those connections and to increase access to jobs, amenities, services, and opportunities for physical activity.

In San Antonio, the median household income is $48,183 (lower than the state average), 75% of people are Hispanic, Latino, or people of color (higher than the state average), and 44% of people speak a language other than English at home (higher than the state average). The project team prepared a composite equity map to identify areas of San Antonio with the highest concentrations of lower income households and people of color. The results are shown on Figure 27 [37] and there are a number of areas contiguous to the existing system that would benefit from an expansion of the service area including the neighborhoods east and west of Downtown.

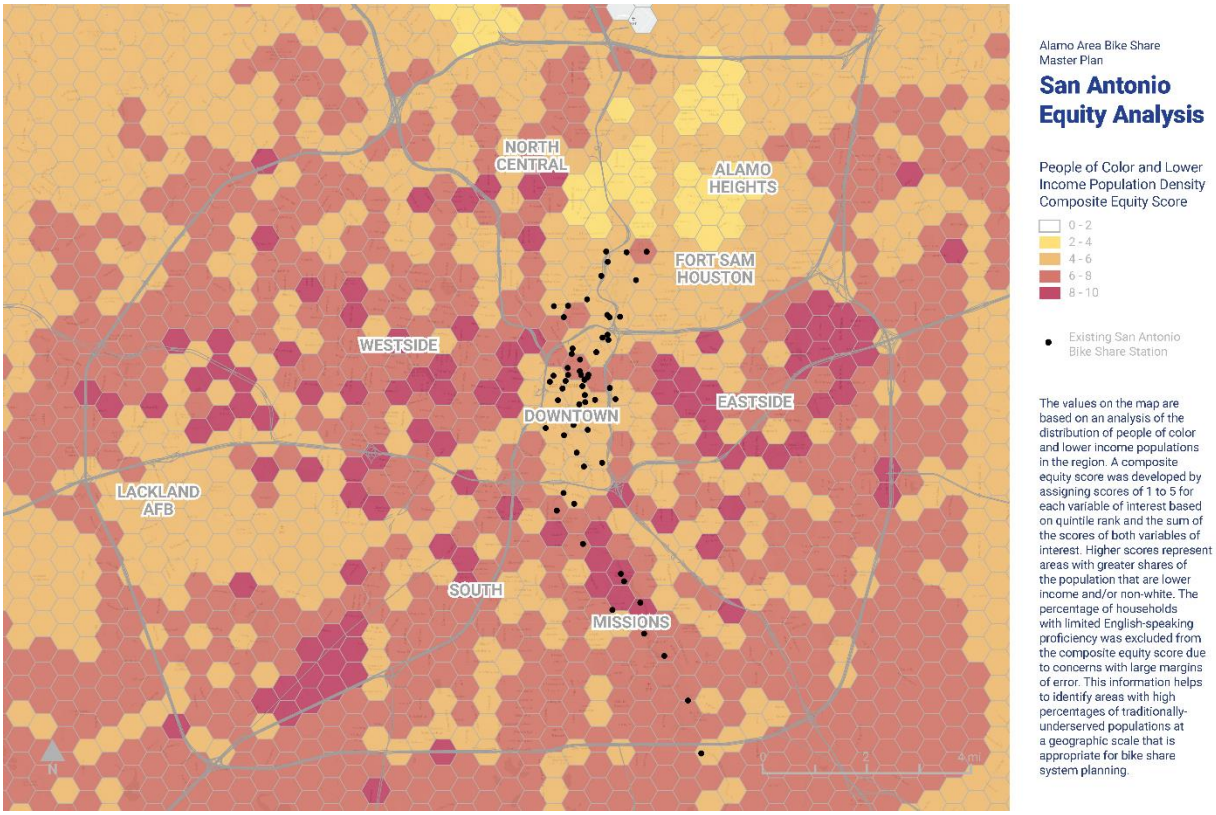


Figure 27: San Antonio Equity Analysis.

[36] Pew Research Center. Accessed May 10, 2016. http://www.pewresearch.org/fact-tank/2016/04/07/who-relies-on-public-transit-in-the-u-s/

[37] The map uses Census Tract data from the American Community Survey 2011 – 2016 five-year estimates, including median household income and percentage of people of color. The data were matched to a hexagonal grid using a weighted area sum. Each hexagon was given a score of 1 through 5 for income and percentage of people of color based on which quintile of the data it fell into (1 indicates high income/low percentage of people of color; 5 indicates low income/high percentage of people of color). These two scores were summed to give a composite equity score with equal weight for each variable. The highest possible composite score that a hexagon could receive was 10 and the lowest was one (some hexagons did not contain data for both categories).

Shared mobility should engage all members of the community and this often takes dedicated resources and effort in underserved communities. In the past, SABS has offered discounted memberships through the San Antonio Housing Authority with minimal response. However, they have created strategic partnerships with the Believe It Foundation and Earn-a-Bike Co-op and secured a couple of small grants to implement three new initiatives:

- The Believe It Foundation provides access to bikes for people with physical disabilities. These bikes are housed in lockers and available to the public at two of SABS' station locations. A pilot program launched in November 2017 now means that for a nominal fee, families can ride together to improve mental and physical health outcomes.
- The Earn-A-Bike program offers after school programs to enforce the importance of good grades, attendance, and nutrition and teaches students basic bike safety, maintenance, and health habits. At the end of the program, children earn a new bike for their participation and SABS is now participating to provide up to 100 annual memberships for parents of these students.
- The Our Coffee Commutes events conducted by SABS teach people how to use bike share and encourages them to incorporate it into their regular transportation patterns to save gas, decrease emissions, and improve health and wellness.

Lime and Bird both operate discount programs for users qualifying for state or federal assistance programs. The "LimeAccess" program offers a 95% discount on regular bike rides and a 50% discount on e-assist bikes and e-scooters. It also allows users to pay in cash using PayNearMe (offered at 27,000 retail locations) removing the barrier of needing a smartphone or credit card.[38] The "One Bird" program waives the $1 check-out fee to qualifying users.[39]

Some other programs that could be good examples for San Antonio are included below.

Adaptive Bikes
The City of Portland's adaptive bike program was designed through interviews with physically disabled community members to learn how a bicycle lending program could best meet their needs. The information gathered led to a program where different types of adaptive bikes are available so that people with different physical abilities can match themselves to an appropriate bicycle. The program offers tandems, hand-cycles, and three-wheeled bikes. It is managed separately from BIKETOWN and in partnership with Albertina Kerr, a non-profit that works with developmentally disabled children and adults. Unlike BIKETOWN, users can only rent bikes from a limited number of locations and the bikes must be returned to their pickup location. Bikes cost $5 per hour or three hours for $12.

Bike Redistribution Requirements
Washington, D.C. requires all dockless bikeshare permit holders distribute and maintain bicycles in all of the Wards within the District. This a major equity initiative for the D.C. Department of Transportation (DDOT) and while there are not specific service requirements written into their permit language, DDOT tracks bicycle locations to ensure this requirement is being met. They are also working on developing service level requirements. Ithaca, NY does not currently require redistribution, but are implementing bike corrals in several low-income neighborhoods and will soon require redistribution of bikes into those neighborhoods.

Intentional Hiring
Ithaca, NY received a Better Bike Share grant to collaborate with community partners to hire and train five "Bike Champions" who conducted outreach and education before, during, and after the launch of dockless bike share in April 2018. Champions range in age from 15 to 70 and come from a diversity of backgrounds. The outreach is focused on several low-income neighborhoods.

[38] https://www.li.me/community-impact
[39] https://www.bird.co/press/bird-announces-one-bird/

Bike Libraries

In Chicago, two local nonprofits, Equiticity and We Keep You Rollin', have partnered with Jump Bikes and Ofo to address racial and economic justice in bicycling and are creating community-based bike share systems, or bike libraries, that give low-to-moderate-income residents the opportunity to borrow bike share bikes for free from a community organization for up to three months. The libraries are located in historically African-American and low-to-moderate-income areas that continue to experience significant disinvestment and marginalization in Chicago. The vision of the initiative is that bikes will help make these communities healthier, safer, more economically viable, more socially cohesive, and ultimately more livable.

5. The Role of San Antonio Bike Share

San Antonio Bike Share provides an important role in the urban mobility framework. It meets the needs of a different demographic than other shared mobility modes and provides an important contribution to improving bicycling culture in the city and encouraging the creating of better bicycling infrastructure. The following plan was developed in consultation with SABS to outline a potential strategy for how the organization can adapt to the changing shared mobility environment.

This involves the following steps:

1. Optimize the existing program,
2. Pilot pedal-assist bicycles,
3. Replace the bicycle fleet with pedal-assist bicycles,
4. Develop a hybrid system using stations and bike racks,
5. Phase out stations and make the system dockless, and
6. Continue to expand the system.

These steps are outlined in more detail below.

5.1. Expansion Options

Expansion options were developed from public and stakeholder feedback, an analysis of current members that are underserved by the existing system, the results of the demand analysis, and the results of the underserved communities' analysis. The recommended expansion plan is shown on Figure 28 and includes east-west expansion to better serve local residents and connect key community destinations including universities, colleges, parks, and community centers. The expansion includes the Westside neighborhoods and Woodlawn Lake; the Eastside Promise Neighborhood, Denver Heights, and Highland Park; and Alamo Heights. A pilot program in the Westside Medical District is also proposed to leverage the City's recent investment in a protected bikeway in this area.

1. **Westside/Woodlawn Lake**
   The Westside/Woodlawn Lake expansion area would introduce bike share to the neighborhoods west of I-10. This area has a few key destinations that would provide anchors for the expansion including at Our Lady of the Lake University, Woodlawn Lake, St. Mary's University, the Guadalupe Cultural Center, and the Martinez Creek trailhead. The area is generally low density and would be best suited to dockless smart bikes. If SABS transitions to this technology, the interim solution will be to operate as a hybrid system with smart dock stations relocated from downtown to the anchor locations and smaller smart bike hubs created in between using bike racks. Users destined for a smart dock station could ride any bike; users destined for a smart bike hub would need to ride a smart bike.

   Improved bicycling infrastructure will be key to the success of this expansion area. The major east-west bikeways are Cincinnati Avenue, the Commerce Street / Buena Vista Street couplet, and Guadalupe Street. All of these streets have bike lanes along part of their length but would benefit from more separation from traffic and filling the gaps that do not have bike facilities. As well, the crossings of I-10 are challenging for the Commerce / Buena Vista couplet and Guadalupe Street and would deter interested but concerned bicyclists from using the system.

   There are no north-south streets through this area with dedicated bike facilities, however there are several local streets that connect through the area that could be converted to bicycle boulevards if investment was focused on improving the major street crossings.

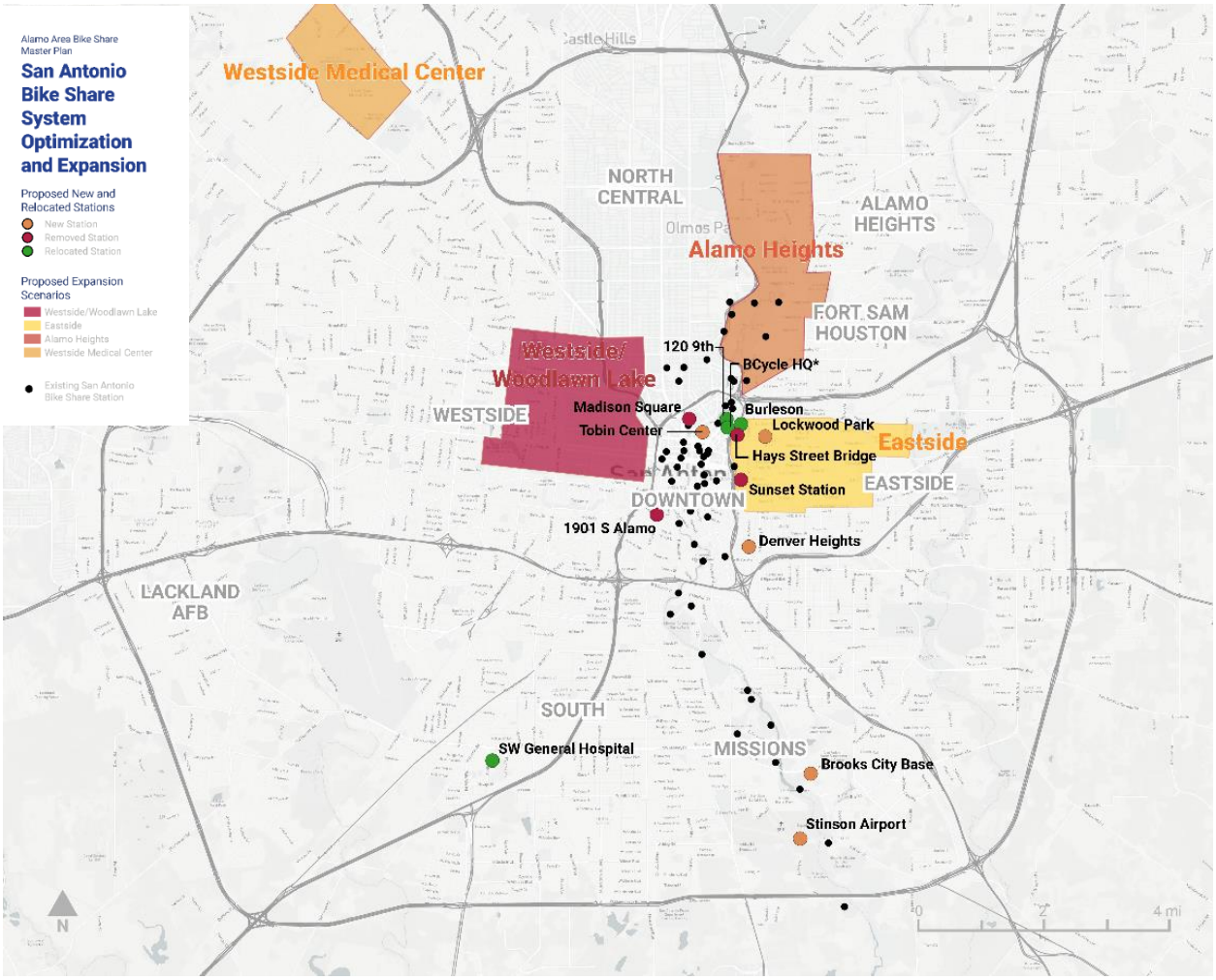


Figure 28 San Antonio Bike Share System Optimization and Expansion

2. **Eastside Promise Neighborhood**
   The Eastside Promise Neighborhood expansion would connect one of the most underserved communities in the San Antonio area with the existing bike share system and increase options for residents of this area to access jobs, services, and recreational destinations. This area already has a high number of SABS members, suggesting that there would be good uptake of the program with more stations in the area. The anchors for this expansion are the Carver, Dawson, Barbara Jordan, and Claude Black Community Centers, St. Phillip's College, and the AT&T Center.

   The area is generally low density and would be best suited to dockless smart bikes. If SABS transitions to this technology, the interim solution will be to operate as a hybrid system with smart dock stations relocated from downtown to the anchor locations and smaller smart bike hubs created in between using bike racks. Users destined for a smart dock station could ride any bike; users destined for a smart bike hub would need to ride a smart bike.

The area has a network of low stress local streets that act as bicycle boulevards including on Hays Street, Center Street, Paso Hondo, and Nevada Street running east-west and Mesquite Street, Pine Street, and Palmetto Avenue running north-south. This is not a complete network with a number of gaps and a number of challenging crossings with major arterial roads. There are connections into downtown San Antonio that cross I-37 at the Hays Streets Bridge and the Commerce Street protected bikeway.

3. **Alamo Heights**
   Expansion into Alamo Heights is driven by the amount of public input supporting more stations in this neighborhood and the number of SABS members that live in this area even though there are few bike share stations there. This phase would extend the program north to include the University of the Incarnate Word, Olmos Basin Park, and Quarry Village (in the City of San Antonio) and incorporate the City of Alamo Heights (i.e., a north boundary of Eisenhauer Road and an eastern boundary of New Braunfels Avenue).

   Alamo Heights is its own city and therefore would require a Memorandum of Understanding with San Antonio Bike Share to allow them to operate on the public right-of-way. This may also introduce additional steps to use state and federal funds for stations and capital purchases in this area. Alamo Heights has parts that are quite steep and would benefit from e-assist technology. As well, the street network is not continuous in all parts of the City, however, there are a lot of low-volume, low-speed streets that could be used to connect people to north-south bike facilities in Olmos Basin Park and on New Braunfels Avenue. Expansion would be greatly supported by improvements to the connectivity and comfort of bikeways in this area. In particular, Broadway Street is a key connection through the community and a gateway to Downtown San Antonio and the rest of the bike share program.

   The system would be best suited to dockless smart bikes. The transition to this technology would include a hybrid phase with smart dock stations relocated from downtown to the anchor locations and smaller smart bike hubs created in between using bike racks. Users destined for a smart dock station could ride any bike; users destined for a smart bike hub would need to ride a smart bike.

4. **Westside Medical Center**
   The Westside Medical Center expansion is suggested to leverage the City's investment in the 2-mile long protected bikeway being constructed on Floyd Curl Drive. A satellite system here could include 3-4 smart dock stations along the bikeway to encourage people to ride. Users are likely to be visitors and employees taking recreational trips (e.g., to relax while visiting a patient) but may also serve some trips between medical facilities or other destinations along the corridor. A smart dock system would provide some limits for where the bike would ride as many of the other streets in the Medical Center are high-volume and high-speed and uncomfortable for bicyclists.

5.2. Technology Update and Transition

The expansion of the system is resource dependent with capital and operating funds required. Expansion into these areas requires equipment that is flexible enough to serve less-dense and more spread out land uses. The industry generally is shifting towards dockless operations and electrifying their bike share fleets, including in other BCycle cities such as Denver, Los Angeles, and Memphis. It is recommended that San Antonio Bike Share start transitioning to an electrified, dockless model rather than continuing to invest in the current smart dock technology. Given there are limited resources available with little identified funding for capital and no additional operating funds to date, this transition will need to occur over time which will require a hybrid system and careful management of the customer experience. A recommended transition plan is outlined below.

Step 1: Optimize the Existing Program

The first phase is to optimize the performance of the current system. The project team visited and assessed every station in the network to determine if there were underperforming stations that could be relocated to better performing locations. The assessment compared ridership at each station with the following variables observed in the field or provided by San Antonio Bike Share:

- Distance to nearest station,
- Space available for expansion,
- Distance to transit,
- Maintenance issues,
- Presence of a bike lane,
- Visibility and comfort of the station location,
- Surrounding land use, and
- Fronting street typology.

The full analysis is included in Appendix A. Stations observing the highest ridership tended to be located at high-activity visitor and tourist destinations such as the Missions, the Blue Star Arts District, and the Pearl District. Many of these stations also have high-quality, comfortable off-street trail access.

The following recommendations were developed to relocate poor performing stations or deploy new stations purchased by the TxDOT funding. Some of these relocations have been made by SABS since the field analysis and some are still awaiting final approval. These changes are shown in Table 5 and on Figure 28.

Table 5: Suggested Bike Share Station Changes

Station Relocations	
Hays Street Bridge	
Sunset Station	This station moved to SW General Hospital Apr 2018
Madison Square	There's a station close by that serves the same catchment area
1901 S Alamo	Low ridership, moved to new Bcycle office
New Station Locations	
Stinson Airport	Interested late 2018 with trail completion
Brooks City Base	New station(s) here, maybe with VIA transit station
Denver Heights	In conjunction with Essex Modern City development
Lockwood Park	Install late 2017
Tobin Center	TXDot funded
Burleson	Moved Madison Square Park to this location summer 2017
BCycle HQ	
120 9th Street	Moving Hays Street Bridge to this location late 2018

Step 2: Pilot E-Assist Bicycles

SABS has access to some funding from the latest TxDOT grant. The stations that these funds were originally earmarked for were held up for approval and the funds will now be reallocated to purchasing 25 e-assist bikes that will be deployed as a pilot amongst the rest of the regular bicycle fleet.

The pedal assist bicycles developed by BCycle have striker loops at the front of the bike so they can be docked in an existing station like any of the 1.0 or 2.0 model bikes. However, they have a battery pack attached that powers the pedal-assist function. It should be noted that this is not a motorized bicycle as it

does not have a throttle function like the e-scooters do and so is permitted to operate wherever a regular bicycle can operate including on the trails and creekways.

The battery packs do not get charged by the station and SABS will need to identify when the batteries are running low and replace and recharge them. This will add some labor costs and some capital costs to refit the operations center with sufficient charging capacity.

The bikes should be identifiable with a different color (as in Los Angeles – see sidebar) or with a quarter panel displaying the lightning bolt icon.

Step 3: Replace the Bicycle Fleet with E-Assist Bicycles

The long-term plan is to convert the entire bicycle fleet to e-assist bikes. During this transition, as more e-bikes are purchased, they can be operated alongside the existing 1.0 and 2.0 model bikes. The existing fleet, especially the remaining 1.0 model bikes are nearing the end of their useful life and SABS will need to decide how much maintenance they are willing to provide to keep these operating. When that burden becomes too great, these bikes can be retired.

Funding has not been identified for the capital costs required to replace the fleet with e-bikes. Each bike is expected to cost approximately $2,500 for the bike, a battery pack, and additional batteries and chargers. Full replacement of the fleet is therefore expected to cost in the order of $1.5 million. Possible funding sources include federal, state, or local grants; or private sponsorship. The new bikes would be outside of the existing sponsorship agreement with Steward Health and as such there may be an opportunity for Steward to increase their sponsorship or for a new sponsor (such as the local energy provider or a solar power company) to take on the new assets. New sponsorship will need to be carefully allocated in the interim as the number of regular bikes in the fleet (included under the Steward Health sponsorship) decreases and the cost of operating e-bikes in addition to regular bikes (until all the regular bikes are replaced) will need to be accounted for from this sponsorship.

Step 4: Develop a Hybrid System

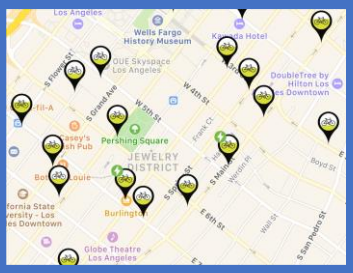
The new e-assist bikes will have the capacity for their own U-lock to be added onto the bike . This will allow the e-assist bike to be docked at a regular station (via the striker loops at the front of the bike) or parked at a regular bike rack (using the built-in U-lock). As bike replacement occurs, new parking locations can be created using regular bike racks (referred to as “hubs”). Over time, the stations can be phased out and fully replaced with hubs. However, it is recommended that this be done over a period of time to familiarize users with the new technology and to limit the operating burden of SABS. The following phasing is recommended:

E-ASSIST FLEET CONVERSION

LA Metro recently introduced 10 of BCycle’s new e-assist bikes into the fleet of 1,000 bikes in Downtown Los Angeles.

The bikes are white to distinguish them from the regular black bikes.

Users look for the green lightning bolt icon on the station map on their smartphone to identify the location of the e-assist bikes.



The pilot was introduced in November 2018 and anecdotally, in the first three weeks the e-assist bikes are getting 7 – 10 times as many rides as the regular bikes.

- Phase 1: incorporate the 25 e-assist bikes as part of the pilot program and allow users only to dock them at a regular station. This requirement would remain until approximately one-fifth or 100 bikes have been replaced with e-assist bikes.

- Phase 2: create bike rack parking at all existing station locations to allow the e-assist bikes to be parked either at a regular station or at a bike rack in the same location. This will reduce the operating burden for SABS to have to chase bikes for maintenance or battery replacement. Approximately 30% of existing stations have bike racks at the location or within view of the station. During Phase 1, SABS should work with the City of San Antonio to prioritize installation of bike racks at the remaining station locations. It is recommended that this phase exist until approximately 200 e-assist bikes are in the system.

- Phase 3: create a hybrid system of stations and hubs. This should occur in one of two ways. Firstly, any stations that have come to the end of their useful life and are beyond replacement should be phased out and removed from the system during this phase.

  For functioning stations, there are approximately 50 of the original or early stations that can be considered for relocation to new locations (i.e., stations funded with federal dollars have to remain in the permitted location for 5-years and that period of time has now passed). Stations still have a value (compared to a hub) in that they provide a physical presence, they advertise the system, they have space for information and maps to be provided, and they have a kiosk that facilitates casual member transactions via credit card for those members not using the app.

  Eligible stations should be considered for relocation to key destinations in the expansion areas, e.g., at Our Lady of the Lake University, Woodlawn Lake, the AT&T Center, etc. The relocated station would be replaced with a bike rack hub. Expansion areas would also be built out with additional hubs in areas that don't justify a smart dock station. This is the recommended approach for between 200 – 400 e-assist bikes and while there are still functioning stations in existence.

- Phase 4: the utility of the existing bike fleet will be essentially lost when there are no functioning bikes left or when there are not enough smart dock station locations to provide users with a significant number of parking locations. Stations should be kept at the highest performing locations as long as there are still functioning bikes, e.g., at the Missions, key locations Downtown, the Pearl, and at Blue Star. The last phase should be conducted all at once with the replacement of the remaining 150 regular bikes. Any functioning bikes could be moved, along with some of the functioning stations, to create satellite systems or sold to another city that is looking to trial bike share.

Step 5: Convert the System to Dockless

Once the bike fleet is fully replaced with e-assist bikes and all the stations are phased out, the system will operate essentially as a dockless system. However, SABS would like to maintain control of the location of the bikes and organization of the system. The bikes will have a built-in U-lock so can be locked to a bike rack, other street furniture, or to themselves. The function of a U-lock is familiar to most riders and so most of these bikes end up locked to something and not just to themselves. Also, hubs can be "geofenced" using GPS zoning so that if a bike is returned to or near a hub the trip is ended. This allows the operator to charge additional fees if the bike is returned to a location outside the hub and helps them recover the cost of locating and picking up the bike for maintenance. In other systems, this convenience is charged $1 to $2 for bikes returned outside a hub (and $1 of that is often credited to a user if they return a bike to a hub) and $10 to $20 for users returning a bike outside the designated service area.

There will be a cost associated with replacing the remaining stations with bike rack hubs. This could be an opportunity for a funding partnership with the City of San Antonio given the hubs could be used for bike share or private bicycling.

Step 6: Continue to Expand the System

Once the system is fully converted to an e-assist bike fleet and is dockless, the system should continue to expand as resources are available. Additional hubs can be added without adding bikes so long as reliability and service levels can be maintained. However, new bikes should continue to be added to the system as it grows and a possible ratio of 10 e-assist bikes to every 5 hubs or 25 bike racks may provide a reasonable balance between coverage, bike availability, and capital cost.

5.3. Financial Analysis

Table 6 includes a financial analysis of the transition plan outlined in Section 5.2. In total, the conversion to e-assist bikes, conversion to a dockless system, the phasing out of the stations, and expansion of the program to 100 hubs and 650 e-assist bikes will cost approximately $2.0 million.

Table 6: Financial Analysis of Future Changes to San Antonio Bike Share

Step	Details	Cost	Funding	Timeline
1. Optimize the existing program				
A. Relocate stations	Relocate under-performing stations to new locations	None	N/A	Complete
B. Deploy new TxDOT funded stations	Purchase and install 3 new stations using TxDOT funding	$ (100,000)	$ 100,000 (TxDOT)	Complete
2. E-Assist pilot program	Purchase and deploy 25 e-bikes as a pilot program amongst the regular bike fleet	$ (62,500)	$ 62,500 (TxDOT)	Mid-2019
3. Replace fleet with e-assist bikes	Continue with full replacement of bicycle fleet with e-bikes (550 bikes)	$ (1.5 million)	None identified	1-5 years
4. Develop a hybrid system	Relocate older stations to new area and infill with hubs created from regular bike racks (assume 50 hubs - 35 new and 15 replacing relocated stations)	$ (0.1 million)	None identified*	1-5 years
5. Make system dockless	Phase out stations as they come to end of operating life. Replace with hubs created from regular bike racks (assume 60 replacement hubs)	$ (0.1 million)	None identified*	5-years
6. Expand the system	Add new e-bikes and hubs at a ratio of 5 hubs per 10 e-bikes (assume 40 hubs and 100 e-bikes)	$ (0.3 million) per 100 e-bikes and 50 hubs	None identified*	5+ years
FUNDING REQUIRED		**$ (2.0 million)**	**None identified**	**5+ years**

* Bike rack "hubs" include regular city bike racks installed in groups on the sidewalk or as bike corrals in the street. These could be opportunities for City funding contribution as the hubs can be used for bike share or private bicycling.

5.4. Role of Partner Agencies to Support Shared Mobility

Infrastructure Improvement

Local and regional agencies should continue to support the build-out of the connected network of bikeways included in the AAMPO Bicycle Plan. Some priority could be given to routes that would enhance shared mobility as there is mutual benefit in enhancing the success of these investments with increased use from these systems.

Equity Considerations

SABS will slowly expand into new areas that can improve access to mobility options for a number of underserved neighborhoods. However, dockless shared mobility can expand much quicker and could provide coverage to areas of the city that would otherwise have to wait or may never get traditional bike share. Providing access for underserved areas could be greatly improved through more specific terms in the City's dockless regulations that specify the amount of coverage expected in these areas and options for providing access to the system for people without a credit card of smartphone.

This is common in other cities that have regulated dockless mobility. For example, both Portland and Denver require a certain percentage of dockless vehicles to be made available to pre-defined underserved areas. This means that vehicles have to be redistributed at least once a day to these areas. This also needs to be enforced and in fact one scooter company was fined in Portland for not meeting this requirement.[40]

Policies and Programs

The partner agencies can support shared mobility in the region by continue to develop policies and programs that leverage the opportunities and address the challenges for these programs. AAMPO can assist through incorporating these modes into their plans and policies, incorporating them in programs and education materials, and along with the City, County, and TxDOT can continue to pursue capital grants for SABS to transition their technology and expand the system.

VIA is exploring options to better integrate bike share and shared mobility into their operations and this could include cross-promotion, integration of fare payment systems, or deeper involvement in operations. See Appendix B for a more detailed review of transit integration options.

The City also recognizes that a number of amendments would be needed to the City code to allow continued and successful use of the e-scooters:

- Section 19-294: currently it is an offense to ride a motor-assisted scooter, neighborhood electric vehicle, pocket bike, or mini-motorbike on the streets or sidewalks.
- Section 19-286: it is unlawful to drive, propel, park, or stand any vehicle upon any sidewalk.
- Section 29-20: currently prohibits individuals and companies from placing any object on sidewalks improved by the Tri-Party Downtown Transportation Improvements Project

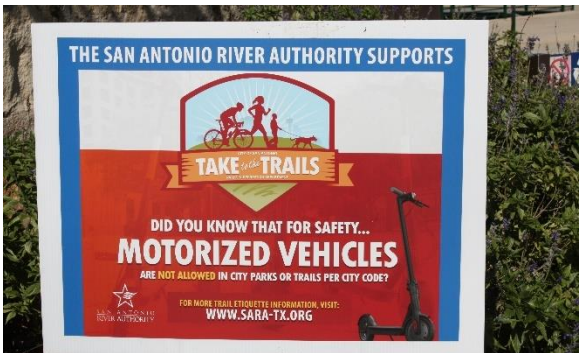


Figure 29: Signage placed at entrance to Riverwalk educating e-scooter riders about trail riding restrictions.

[40] https://www.kptv.com/news/e-scooter-company-fined-for-violations-during-portland-s-pilot/article_81502dc4-e7b5-11e8-98e7-bb3c83ea4c63.html

- E-scooters are currently not allowed to be ridden on trails, creek ways, plazas, and in parks. The San Antonio River Authority would need to re-consider and change this policy if e-scooters were to be allowed on the River Trail.

6. Conclusions and Recommendations

San Antonio Bike Share (SABS) is a long-running and successful bike share program. It has broad community support and has increased access to bicycling and enhanced visitor experience and mobility options since starting in 2011. However, the technology is dated and some of it is coming to the end of its useful life. It is a smart dock system and because of the upfront capital required for stations, it is not well suited to expansion into lower density areas of the city.

Trends in the industry are for more flexible "shared mobility systems" that include dockless bikes, pedal-assist bikes (e-assist bikes), and electric-powered scooters (e-scooters) and allow users to park a device at their destination. These systems are well funded by venture capital, tech companies, and large mobility companies. They are privately-owned businesses that provide the system and use (or often pay to use) the public right-of-way.

Dockless shared mobility has expanded rapidly since 2017 and most recently, these companies have focused on e-scooters that appear to have better ridership than other shared mobility modes and appeal to a number of different demographics as compared to bike share. In June 2018, several dockless companies deployed unpermitted e-scooter fleets in San Antonio. As a result, the City of San Antonio conducted outreach to stakeholders, the dockless companies, and the public and utilized examples from other cities to develop regulations to permit dockless shared vehicle operations. This is a 6-month pilot program with no limits on the number of companies or devices. Although this is open to all types of dockless vehicles, the companies have so far only deployed e-scooters. Unless there is significant future interest to provide bikes, SABS may be able to fill this market niche.

Other cities with established smart dock systems have also been navigating the introduction of dockless shared mobility. These cities have taken a number of directions including business-as-usual, transitioning from non-profit ownership to agency or transit agency ownership, privatization to adapt the program to the market-driven model, replacement of the program, and protection of the existing program through bans on other models. All of these options are available to SABS. However, until the impacts of dockless shared mobility are better understood, or until the resources, such as grant funding, sponsorship, etc., are no longer available, the SABS has a desire to continue operating. It is a long-term fixture in Central San Antonio with a proven record. It also provides access to bicycles not currently provided by the e-scooter companies.

Nevertheless, SABS understands that it needs to adapt to better compete and to enable expansion into new areas. BCycle, the provider of the current technology, has recently developed and implemented a smart bike (dockless) model and an e-assist bicycle compatible with either a smart dock or smart bike system. They are also working on a blue-tooth add-on that will convert smart dock bikes to smart bikes.

Committing to these technology upgrades will allow SABS to expand the system both in terms of the geography covered as well as the flexibility within the service area. An extensive stakeholder and public outreach process identified that east-west expansion into the westside neighborhoods to provide coverage to Our Lady of the Lake University, St. Mary's University, and Woodlawn Lake and into the eastside neighborhoods serving the Eastside Promise Neighborhood, Denver Heights, and Highland Park. Expansion should also include Alamo Heights and as this is a separate jurisdiction, SABS would require some form of Memorandum of Understanding or other agreement to allow them to use the public right-of-way. A pilot satellite program in the Westside Medical District is also recommended to leverage the investment being made into the protected bikeway along Floyd Curl Drive.

It is recommended that transition to the new technology and geographic expansion occur together in the following process:

- Phase 1 – Optimize the Existing Program: by relocating underperforming stations to new and better performing locations. SABS has already relocated most of the stations recommended in this study but should evaluate station locations every year.
- Phase 2 – Pilot E-Assist Bicycles: the remaining TxDOT grant funds will be reallocated to purchase 25 e-assist bikes that will be incorporated into the existing fleet. These will be evaluated for performance and the experience from other cities is that e-assist bikes get considerably more ridership that regular bikes.
- Phase 3 – Replace the Bicycle Fleet with E-Assist Bicycles: over time, the remainder of the fleet should be replaced with e-assist bikes. As existing bikes come to the end of their useful life they can be retired from the fleet and in the meantime, additional e-assist bikes should be purchased and added to the fleet as funding allows.
- Phase 4 – Develop a Hybrid System: the e-assist bikes can be used in a smart dock or smart bike set up. In addition, BCycle is developing a Bluetooth locking technology that will allow smart dock bikes to be converted to smart bikes. As the system is being converted to a smart bike system, it will need to operate as a "hybrid" system. This means that over time, regular bike racks should be added to every existing smart dock station so that both smart dock and smart bikes can be parked there; as well, some of the smart dock stations should be relocated from underperforming locations downtown and be replaced with regular bike racks. These should be relocated to key destinations in the new expansion areas. Beyond that, additional hubs can be added with regular bike racks in the expansion areas.
- Phase 5 – Convert the System to Dockless: this is the end result of Phase 4 and would include retiring old smart dock bikes that have come to the end of their useful life, converting (or enabling) the smart bike function on the new e-assist bikes, and using the Bluetooth lock technology (once developed) to convert the existing fleet to smart bikes.
- Phase 6 – Continue to Expand the System: once the system is fully converted to an e-assist fleet and is dockless, expansion can continue to occur by adding bikes and bike racks to the system.

This transition will require approximately $2 million in capital funding that is yet to be identified. Additional operations and maintenance will also be needed to accommodate the additional scale of the system. There may be opportunities to increase ridership through a more attractive and flexible product as well as additional opportunities for sponsors to get involved with the program. The timeline of this transition and expansion is dependent on a number of factors. Phases 1 and 2 can be completed now as they have resources through the latest TxDOT grant to complete them. However, Phases 3-6 require funding to be identified and allocated, which could take a number of years.

In the meantime, dockless shared mobility could be a way to provide coverage to areas of the city that would otherwise have to wait or may never get traditional bike share. Providing access for underserved areas could be greatly improved through more specific terms in the City's dockless regulations that specify the amount of coverage expected in these areas and options for providing access to the system for people without a credit card of smartphone.

The partner agencies can support shared mobility in the region by continue to develop policies and programs that leverage the opportunities and address the challenges for these programs. The City of San Antonio is a key player in this through its evaluation of the existing dockless pilot program and any changes that they make to the terms of a more formal program. As well, there are a number of city codes that need to be changed for long-term accommodation of e-scooters. AAMPO can assist through incorporating these modes in their plans and policies, incorporating them in programs and education materials, and along with the City, County, and TxDOT can continue to pursue capital grants for SABS to transition their technology and expand the system. VIA is exploring options to better integrate bike share and shared mobility into their operations and this could include cross-promotion, integration of fare payment systems, or deeper involvement in operations.

Appendix A – Station Assessment Matrix

Appendix B – Transit Integration

A successful transit system offers a seamless transition between multiple modes. Bike share could play an important role in the San Antonio transit system by offering a relatively low-cost-to-implement solution to first and last mile travel. In the U.S., bike share systems are attempting to better integrate with other transit systems and there are generally five levels of possible integration as described in Table A-7 and includes co-location, station branding and marketing, integrated fare cards, integrated fare payment, and operations, maintenance, and oversight.

Table A-7: Transit Integration Levels and Possible Actions in San Antonio

Level	Application	Example	Potential	Possible Actions
Level 1 – Geographic Integration	Stations are placed at or near transit stops.	Boston, MA	High	-Continue to co-locate bike share stations with VIA transit stops. -Create opportunities to include bike share stations when developing new transit stop locations.
Level 2 – Station Branding and Marketing Integration	Bike share and transit is co-branded and co-marketed.	Pittsburgh, PA	High	-Show bike share stations on VIA's system maps. -Explore cross-marketing opportunities on each other's website, marketing collateral, and outreach events. Include bike share in future trip planning tools and apps.
Level 3 – Semi-Integrated Fare Cards	A single card is used for bike share and transit fare payment. back-end financial processing systems are separate and users must maintain two separate accounts.	Los Angeles, CA	Medium	SABS and VIA are discussing how to implement some level of fare integration in 2018. This could include: • Providing a discount or promotional code with VIA's regular and e-fare tickets that can be applied towards a discounted 24-hour and/or monthly bike share membership. • Exploring opportunities to promote bike share membership sales through VIA's established Corporate Transit Benefit program. • Developing an agreement with VIA to sell bike share memberships at VIA Customer Service Centers and ticket kiosks.
Level 4 – Fully Integrated Fare Payment	Transit and bike share payment systems are fully integrated into one account with a single card that can be used to pay for all transit modes.	Not currently implemented in the U.S.	Low	Include SABS in any future discussion about an integrated fare payment card in the San Antonio region.
Level 5 – Operations, Maintenance, and Oversight	Bike share system is owned and overseen by the transit agency.	Las Vegas, NV	Low	VIA is a long-time partner of San Antonio Bike Share but does appear to have interest in managing the program. If there was mutual interest, VIA would need to build in staff capacity to oversee the program but could enter into an operating contract with SABS or another vendor to provide operating services.

Level 1 – Co-Location
Stations are placed at or near transit stops. Several programs have utilized Federal Transit Administration grants (e.g., Chattanooga, TN and Boston, MA) and others are utilizing new federal grant funding rules to place bike share stations within a three-mile radius of transit stops. San Antonio has several examples of where stations are already located near VIA bus stops as shown in Figure A-31.

Level 2 – Station Branding and Bike Share Marketing Integration
Bike share and transit is co-branded and co-marketed. For example, the Regional Transit Commission of Southern Nevada (RTC) oversees bike share as part of their transit offerings and has named it RTC Bike Share and branded the system with its colors (see Figure 30). Several programs including Bublr bike share in Milwaukee, WI and PGH Bike Share in Pittsburgh have informal partnerships with their local transit authorities that include incorporating bike share into transit marketing materials, transit branding displayed on the bike share bikes, and incorporating bike share stations into system maps, mobile applications, and trip planning.

Figure 30: RTC Bike Share in Las Vegas, NV incorporates the RTC brand in the name and logo.

Level 3 – Semi-Integrated Fare Cards
A bike share membership can be coded onto a transit fare payment card to allow a single card to be used for bike share and transit fare payment. However, the back-end financial processing systems are separate and users would need to maintain two separate accounts. This is available in several bike share programs in the United States.

Los Angeles (LA) Metro has incorporated bike share into their transit fare card (TAP card) system. When a transit rider purchases a TAP card they can go online or call Metro Bike Share and/or Breeze Bike Share to register for a bike share membership and add that membership to the TAP card. The bike share membership requires credit card registration to

Figure A-31 (right): Examples of San Antonio Bike Share stations co-located with transit stops (top and middle); example of co-location of dockless e-scooters with transit (bottom).

cover any overage fees or lost bikes (this is not required for the transit function). The TAP card includes an RFID chip that can be programmed with multiple accounts and that can be recognized at the bike share station to check out a bike. However, the transit and bike share accounts are separate and funds stored on the TAP card for transit cannot be used for bike share charges. These are charged directly to the registered credit card.

WE-cycle in Aspen offers a similar program and has partnered with the Roaring Fork Transit Authority (RFTA) to offer a free WE-cycle season pass for RFTA Seasonal Zone Passholders. WE-cycle is also available on the Transit app where users can buy bike share passes or transit tickets, check real-time dock and bike availability, and plan trips. Additionally, almost all of Aspen's WE-cycle stations are within 300 feet of an RFTA stop.

In Pittsburgh, transit riders that have a Port Authority Connect Card can visit a Healthy Ride bike share kiosk to sign up and link their bike share account to their Connect Card. Once this is complete, the Connect Card can be used at any bike share bike to check-out a bike for an unlimited number of 15-minute or less trips for no additional cost.

Level 4 – Fully Integrated Fare Payment
Transit and bike share payment systems are fully integrated into one account with a single card that can be used to pay for all transit modes. This would be the equivalent of adding bike share to the ORCA card in Seattle or the Clipper Card in the San Francisco Bay Area. In the U.S., there are no transit agencies that have fully integrated their fare payment systems to include bike share. These systems do exist in other parts of the world such as the “Intelligent Card (IC)” system in Japan. However, in the U.S., there are technical and institutional barriers to overcome including different card reader technologies, security protocols, and the need to develop revenue sharing agreements and decision-making structures between multiple organizations. VIA does not currently offer an integrated payment card.

Level 5 – Operations, Maintenance, and Oversight Integration
In this scenario, the bike share system is owned and overseen by the transit agency, similar to the models implemented in Boise, ID, Las Vegas, NV, and Topeka, KS. The transit agency may hire staff internally to operate the system as is the case in Boise and Topeka or may contract operations to a third party (as they might for other transit modes). This would be equivalent to VIA owning and overseeing the bike share program in San Antonio.